OCTOBER 25, 1922

THE RUBBER AGE

VOL. XII. NO. 2

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PUBLISHED ON THE 10th AND 25th OF EACH MONTH BY

THE GARDNER, MOFFAT COMPANY, Inc.

PUBLICATION OFFICE: HIGHLAND, N. Y.

ADDRESS ALL CORRESPONDENCE TO BUSINESS AND EDITORIAL ROOMS: 225 FOURTH AVENUE, NEW YORK

Telephone: Stuyvesant 4552

Advertising Forms Close Ten Days Before Date of Publication. Rates for Advertising Will Be Furnished on Application. Subscription Price: $2.00 per Annum. Single Copies 10 Cents. Canada, $2.50 per Annum. Foreign, $3.00 per Annum.

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"REDSONDER, NEW YORK"
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THE
RUBBER AGE

VOL. XII. OCTOBER 25, 1922 No. 2

SCIENTIFIC MANAGEMENT FOR RUBBER MANUFACTURERS

Production Standards and Rate Fixing - VIII.

This Outline of Time Study Methods and Procedure and Piece-Work Ratings Will Be Found of Especial Value in Figuring Production Costs

By Alfred Baruch

Consulting Industrial Engineer, New York

THE basis upon which the efforts of men and machines must be measured in the factory is time. In order to produce a certain number of tires per month it is necessary for a smaller number to be produced each hour and this number is in direct ratio to the monthly requirement. This means of course that all the component parts of the tire must be produced at a definite rate per hour so that they may be assembled in the carcass and thus meet the monthly schedule. Time thus becomes the measure of efficiency as well as of value. The number of cuts a Cameron machine can make per hour determines the number of plies that can be cut. The number of plies a carcass builder can lay per hour determines the number of tires that can be cured. Thus, after the best machines available have been secured and properly arranged, the most important function of the management is to determine accurately the length of time it takes to perform each operation and to plan the flow of material and the distribution of labor accordingly.

Importance of Studies

Time studies must be made very carefully. The men selected for this work should be specially trained in quick observation and should possess intelligence and tact sufficient to avoid arousing the antagonism of the workmen. It is practically impossible and often silly to try to hide from the worker the fact that time studies are being made. Once he is aware of it, he is likely to attempt to slow up the operation if the time study operator is not experienced enough to catch him. I have often seen a calender man slow down his machine when a time study was being made on the plea that this particular compound will burn up if the machine is not run very slowly. It requires a time study man who knows his specifications to pass on the truth of a statement of this sort. At the same time a tactless operator would not know how to get the control man to put the calender back to its normal speed without rousing the ire of the calender crew.

Time studies have two chief functions. The first is to determine the elapsed time of each operation in order to make proper scheduling of the work possible. The second is to set the rate for wage payment on a piece work basis.

The information as to elapsed time during operations is absolutely essential to scheduling. In order to turn out the required number of units in each department to make up the manufacturing schedule it is necessary to know how long it takes to perform each operation and to match that up with the available equipment. This was done formerly by the production superintendent. But the way it worked out was that the work was put into process and material was ordered to the machines to meet it. When the sales department wanted tires or tubes or hose, it would write an order on the stock room if one was maintained. The stockkeeper would fill the order if he had what was wanted. Otherwise, he would go to superintendent and ask him to rush through some tires of the required sizes, provided the order called for tires. The superintendent would get after the foreman of the cure room who in turn would prod the foreman of the tire building department, and so on down the line.

Old Method Confusing

Under this method everything is confusion. There is no information available in the compound or the mill rooms sufficiently in advance of the actual need to make it possible for the foreman to plan his work. Rubber products are usually regarded as stock commodities and, when orders are placed, it is expected that they will be delivered at once. This is unlike a special machine shop where it is known that machines have to be made to individual orders and that they will therefore take a long time.

In order to avoid delays and to get the maximum results from both men and machines it is necessary to have recorded information as to the length of time of each operation and the length of time it takes material to move through the various storage places from department to department. There are two ways in which this information can be obtained. One is to search back through production records or time reports and to average the results for a long period in order to arrive at some estimate of the number of pieces that have gone through each department each day and in this way arrive at a working basis for scheduling production. However, this method does not bring out the capacity of the individual machines and after

all this is the only really important knowledge when it comes to planning work. Another objection to this method is that it is purely record work and suggests no improvement in the manner of performing the operation.

On the other hand, time studies by stop watch do this almost automatically. The men who make the time studies are usually trained men, often engineers. It is impossible for them to make their observations until they have become thoroughly familiar with the operations themselves. It is natural that the useless motions should become apparent to them and that the correct way should suggest itself. Furthermore it is necessary for them to analyze each operation minutely and to split it down to its component parts. When this is done the elimination of lost motion becomes an easy matter.

Time Study Procedure

In making time studies it is necessary to prepare for the work in much the same way that standardization in general is accomplished. First develop specialists who can become thoroughly familiar with the operation and who can establish friendly relations with the workmen themselves. Not all of the prejudice against the use of the stop-watch has died down as yet and it is absolutely necessary to win the cooperation of the men or else the work will be useless. Then classify the operations according to their nature. That is, determine whether the operation is manual or mechanical. This is very

TIME STUDY SHEET

KIND OF WORK _____

LABOR OPERATION	NUMBER OF UNITS	TIME	UNIT TIME	RATE PER HOUR	UNIT COST

Form for Determining Unit Cost for Labor Operations This may be Used for Studies that are Made from Stop-Watch or from Job Cards

important when the motions are analyzed so as to eliminate the useless ones.

Having classified the operations, it is necessary to break them down to their elementary movements. This is done by having the stop-watch operator list everything that the workman has to do in the chronological order of the motions. Having obtained a complete analysis of all operations and their component movements, begin the study of the motions so as to eliminate the unnecessary ones. This part of the study has two divisions: the intensive examination and the extensive one. The intensive study consists of establishing the best practice of the most skilled workers. The extensive study consists of taking away duties that can be done by a less highly paid man or else eliminated by a rearrangement of the equipment or the service to the worker.

Example of Extensive Study

In order to illustrate the above, a simple motion study is given in the tube department. This is a laminated tube and the work consists of cutting a sheet of rubber to length, rolling it on a pole or mandrel, and then wrapping it so that it may be cured. The empty mandrels are delivered to the rolling table but the workers have to fetch their own material. The first study is of the method that grew up as a result of the development of laminated tube. The second method given shows the effects of time and motion study.

OPERATION NO. 1 Roll-up (Labor: two men. Equipment: flat table with winding device at end).

Motion 1.—Fetch material. (Workers must walk fifty feet to racks and, carry roll of sheet rubber to table).

Motion 2.—Pull sheet to necessary length as indicated by mark on table and cut.

Motion 3.—Soapstone sheet.

Motion 4.—Place mandrel on sheet. (Mandrel is taken from a truck standing).

Motion 5.—Spot valve patch on sheet.

Motion 6.—Roll up.

Motion 7.—Benzine edge.

Motion 8.—Place rolled tube on truck.

OPERATION NO. 2. Wrap lengthwise. (Labor: two men. Material: rolled tubes which have been brought by truck to wrapping table. Equipment: flat table).

Motion 1.—Spread cloth wrap on table.

Motion 2.—Take rolled tube from truck and place on cloth.

Motion 3.—Roll up in cloth.

Motion 4.—Place tube on truck.

OPERATION NO. 3. Wrap tube crosswise. (Labor: one man. Equipment: turning lathe used to turn mandrel while it is being wrapped.)

Motion 1.—Take wrapped tube from truck and set in lathe.

Motion 2.—Take roll of wrapping tape from basket and make one end fast to the mandrel.

Motion 3.—Wrap tape around mandrel by turning latter in lathe.

Motion 4.—Remove mandrel and place on truck.

The Betterment

Comparison of the time taken on this study revealed the fact that the three operations in total took practically the same length of time. By bringing the three tables close together so that the men on the roll-up table could place the rolled-tube in a rack on the first wrapping table with one motion and without taking a step, and then doing the same with the cross wrapping machine, it became possible to reduce three operations to one. This eliminated the last motion in the first two operations and the trucking from table to table. The effect of synchronizing the three operations was to increase the hourly production per man since the five men now worked as one gang and forced each other to work at top speed in order to avoid delay. They were all on a piece-work basis.

This is an excellent illustration of extensive studies. Intensive studies on the same set of operations brought about considerable saving in time through a perfect division of labor between the two men at each table. The intensive study is made by analyzing the operation of the best workmen from the point of view of both time and motion. It does not follow that one man did everything in the best way possible, but by comparing the time taken for each motion by several of the best men it was possible to establish a standard practice which combined the best motions of all the good men.

The importance of a complete elimination of unnecessary motions and development of a perfect standard practice before establishing production and wage rates is far greater than most managers imagine. It is the only way in which piece rates can be scientifically fixed. The writer recalls vividly the bitterness with which cuts in the rate were taken by the men when he himself was a factory worker on a piece-work basis of payment. We had managed to increase production considerably after a rate had been set and incidentally we increased our weekly earnings in proportion. The management got the impression that the first rate had been too high and ordered a rate cut which compelled us to work at top speed in order to make the wages of a mediocre man under the former rate. The general feeling was that we had been betrayed into showing what we could do so that the rate might be cut to force us up to a breakneck speed. After that no man in that plant made the slightest effort to do anything else than just make wages and the management lost much more than if it had continued to pay at the higher rate.

Changing Rate Difficult

Once the rate is established it cannot be lowered easily unless some radical change of method makes it possible to produce in greater quantity without additional exertion. It is therefore necessary to make the time studies carefully and to have the reports properly analyzed before the rate is established. When these studies have been made it is necessary to tabulate them in the sequence of operation and to identify each operation by an index number so that any changes that are made necessary by later studies can be incorporated

without affecting the records that remain unchanged. These records should include a detailed description of the motions themselves so that all instructors will be guided by exactly the same set of rules and all new workmen will be taught to make the same motions in exactly the same way, no matter who the instructor may be.

In addition to the time established by exact stop-watch observation it is necessary to make an allowance for unavoidable delays. By this is meant shortages of materials, machine breakdowns, and lack of orders. Where these conditions are chronic it is necessary to eliminate them before the final rate is fixed so that the rates will not be disturbed by the process of betterment operations in the plant. As a complete overhauling of the production routine would delay the rate fixing and production scheduling for sometime, an alternative method will be described later on in this chapter by which it is possible to introduce the various betterments without disturbing production.

It is the writer's opinion that no attempts should be made to set up a temporary rate for a new worker. Each man should be trained to come up to the normal production before he is put on a piece-rate basis. However, in scheduling production it will be necessary to make some allowance for the fact that a certain percentage of the workers are new and cannot therefore be expected to produce the normal quantity of units for each operation. As this is very closely connected with the percentage of labor turnover which is measurable no difficulty should be experienced in arriving at a true estimate of the allowance to make.

Where an operation requires manual exertion it would be necessary to make an allowance for the amount of time required for rest periods due to fatigue. The question of fatigue and its effect on labor efficiency and liability of accidents is so important in considering the scientific management of a plant that it will be taken up again and treated more fully in another chapter.

After all of the allowances have been made it is possible to add up the remaining time for each motion by operations which will serve as a code of practice for the instruction department, as a basis for scheduling for the planning department, and as a means for establishing the piece-work rate. Such minute analyses of production will often reveal fundamental weaknesses in method, in equipment, and in training of men which indicate the improvements that have to be made, and thus automatically increase production and reduce the cost of operation.

The above procedure for time-study work is patterned after the methods established by Taylor. No improvement on his methods have yet been discovered where it is desired to establish complete scientific management. However, Taylor was never arbitrary in describing his findings and each industry will have to work out its problems in accordance with the conditions that prevail in it. This is especially true of the small rubber manufacturers who cannot afford to spend a large sum of money and several years of time in putting their business on a scientific basis. Consequently a plan is offered below by which it is possible to bring about most of these improvements without disturbing production.

Other Methods

This plan is to divide the plant into a number of smaller plants according to departments, and to establish an office for controlling production on a somewhat broader basis that was indicated in the chapter on planning and dispatching. Under this method the department is represented graphically in the departmental office. Huge boards are set up containing a pocket or slide for each machine or production center depending on the nature of the work within that department. The orders for work to be done are accumulated on one side of this pocket. This information is repeated briefly on a graphic strip which represents a machine or production center. This strip also indicates the rate at which this machine is expected to produce. As the day advances the reports of actual accomplishment are posted on the board and compared with the standard rate of accomplishment for each machine as indicated by the strip. Whenever there is an interruption to production the cause for delay is also noted on the strip.

No Stop-Watch

By this method a body of information is gradually accumulated which indicates the causes of chronic inefficiency in the plant. As soon as these inefficiencies are shown up steps are taken to correct them and eventually the plant is put on a basis of higher production efficiency. It is noteworthy that under this method it is possible to eliminate stop-watch studies since the individual machine record will accumulate the desired information. In order to show the operation of this method the following excerpt is taken from one of the writer's reports:

"The equipment control board has two major graphic representations on it: the first is the graphic job card by machine showing every job run on every machine for eight hours: The second is the machine graphic sketch showing the efficiency of each individual machine as based on the production schedule. The board clerk must file the graphic job cards in parallel to the strip and in the sequence indicated by the order number.

"One hour before the job is to be run on the calender the clerk must write out an order for liners and shells and all material needed. After he has issued these orders he indicates on the graphic job card that material and necessary equipment have been assigned to complete this order. The rate used for reporting production is determined by the number of rolls that each calender can turn out under normal conditions.

"Any changes in schedule are indicated in the board by rearranging the graphic job card so as to show the new sequence in which the jobs are to be run. This is done by the board clerk only and no one else must disturb the arrangement of the cards on the board."

Under either of the two methods described above it is necessary to develop permanent organization that will be able to carry on the work of analysis as long as the plant is active and suggest corrections as they are needed. The questions of wages and incentives for labor and the records that are needed will be discussed in another chapter.

Rubber Factory Hygiene

There are two ways in which workers can be poisoned in a rubber factory. In the first place fumes of the various solvents, used in the manufacture of rubber goods, such as carbon disulphide, sulphur chloride, carbon-chlorine compounds or benzol, may invade the room in which the workers are employed. In the second place the workers may come in contact with lead or compounds of lead, which are used in compounding rubber. The use of lead compounds in powder form has been practiced in other industries besides the rubber industry, and has always been productive of bad results as far as the health of the workers is concerned. There is now being put out on the English market a product which is especially designed for rubber manufacturers. This is a mixture of rubber and lead. The mixtures generally contain 80 parts of lead salt and 20 parts of rubber, and are sold in the form of thin sheets which are homogeneous in composition, and are used in the incorporating rolls in the place of dry lead compounds. In practice it has been found that the mixture works well and a demand for the product has been established. The material is made in lead factories where the hygienic conditions, due to long experience with the manufacture of lead salts, are well-regulated and understood. It is evident that no lead dust can be created through the use of this material, and hence the danger of lead poisoning is removed. The official authorities in England, who are concerned with labor conditions in factories, have given their sanction to this new product. (From an article by C. A. Klein, *Journal of the Society of Chemical Industry*, 1922, 325 ff.)

Rubber Preservative

Silicofluoride of soda is used a mold preventitive in the rubber latex. The addition of 0.06 per cent of sodium silicofluoride to standardized latex should be sufficient to inhibit mold growth in the finished smoked sheet rubber. Samples produced in this manner were satisfactory, the tensile strength after vulcanization being good and the rate of vulcanization slightly less than the average smoked sheet rubber. See Bull. Rubber Growers' Association, 1922, 4, 227-8.

Testing Rubber Compounded with Zinc Oxide and Litharge

By Dr. Henry P. Stevens

Consulting Chemist of the Rubber Growers' Association, London

AS is well known, practically all tests carried out on plantation rubber on behalf of plantation interests, whether at home or in the East, have been made with a mixture of rubber with a relatively large proportion of sulphur and without any other ingredients. Such a mixture has the advantage of simplicity and of emphasizing variations in rate of cure of vulcanization, and these are good grounds for its general adoption. On the other hand, I have frequently urged that the experimental basis of testing should be widened to include mixings containing some of the more typical compounding ingredients and a proportion of sulphur more in accordance with ordinary manufacturing practice.

If proof were required that tests with a typical compounding ingredient were necessary, I need only point out that such tests are made by the larger manufacturers, and that a consignment of rubber which may give satisfactory results when mixed with one ingredient may give unsatisfactory results with another. It has been stated by some who, perhaps, are not very closely in touch with actual rubber manufacture, that the restriction of the sulphur content and the introduction of mineral matter merely modifies the results obtained. Take, for instance, a series of samples curing at various rates when using a rubber and excess of sulphur mix. If now we substitute for this mix one containing addition ingredients and less sulphur, it is stated that the samples will not fall into the same order as before in regard to rate of cure, but the differences in rate of cure between individual samples will be less.

Modifications in Vulcanization

There is no doubt that this statement is correct when the modification is limited to a reduction of the sulphur content and the introduction of some quite inert material, but only with these limitations. If inert minerals are used it is important to know what modification in vulcanization is produced. Two samples of rubber, for instance, when tested in the usual manner, show a wide difference in rate of cure, say 50 per cent. If these be compounded so as to reduce the proportion of raw rubber from 90 per cent to the more ordinary figure of 40 per cent, and if the proportion of sulphur in the raw rubber be reduced from 10 per cent to the more ordinary figure of 4 per cent or 5 per cent, what will then be the difference in rate of cure? Will it be such as to make an appreciable difference in manufacturing procedure?

Presuming there is still such a difference in rate of cure as to give trouble in manufacture, can this be overcome by the incorporation of suitable accelerators organic or inorganic? If the ordinary rubber sulphur mixture be further modified by the introduction of an active ingredient it is important to ascertain how far differences in the raw rubber are reflected in the vulcanizing results.

Zinc oxide is one of the commonest ingredients of rubber mixtures. It has long been recognized to give a desirable effect, although no sufficient explanation has been put forward to account for the effect produced. Its effect is similar to that of a very finely divided substance, yet it is generally agreed that it is not so finely divided as would be expected from its behavior. Zinc oxide has usually been regarded as an inert material and normally is little changed during vulcanizing. In most text books it will be found classified with fillers such as barytes and French chalk.

More recent work appears to show that zinc oxide has a marked effect in increasing the efficiency of some organic accelerators, so that it is essential to employ a substantial proportion of zinc oxide when using these accelerators, if reasonable advantage of their activity is to be obtained. This led Mr. Tuttle, an American chemist, to state that zinc oxide should be included in all mixings for the testing of plantation rubber. This matter was discussed in a previous report (article 1, *Bulletin*, October, 1921, p. 393), and it was shown that parallel results were obtained for vulcanized mixings with and without zinc oxide.

The addition of the zinc oxide modified the physical properties, as obviously it must do, but the relationship between samples of rubber in regard to variation in rate of cure, was the same whether zinc oxide was used or not, and this was clearly illustrated by the curves for the elongation at a constant load. At the conclusion of the above mentioned article, it was stated that similar tests would be made with and without zinc oxide, using specimens of rubber matured to different degrees, that is, containing a varying amount of natural accelerator. These tests are now complete and discussed below.

Scheme of Experiments

The scheme of experiment was widened to include mixings made with litharge, a well-known inorganic accelerator, used in very large quantities. In many ways the behavior of litharge is unique, it is the only inorganic accelerator which enables rubber to be vulcanized in the air, that is, it protects the rubber from oxidation. The litharge (oxide of lead) is itself changed with the formation of lead sulphide. Litharge, therefore, uses up part of the sulphur added for vulcanizing, so that if the proportion of sulphur be limited, there is a competition between litharge and the rubber for the sulphur, which enables a better control of the degree of vulcanization.

It is difficult to "overcure" such compounded rubber. Lead sulphide is black, litharge yellow or buff in color, so that the progress of vulcanization is accompanied by the change in color. The effect of litharge is profoundly modified by the caoutchouc constituents of raw rubber, particularly the acetone soluble portion, commonly referred to as "resin." If rubber from which the resin has been removed be compounded with litharge, it will hardly vulcanize at all. If the extracted resin be replaced satisfactory vulcanization ensues. The main ingredient of the "resin" is a substance, inositol. If this substance be purified it does not restore the vulcanizing properties to the rubber from which the resins have been extracted. Hence the "active" constituent of the resins is not the inositol, but some other substance.

It is obvious that the proportion of this other substance will vary in different raw rubber, and a measurement of the amount of acetone extract will not be a guide as to the amount present in different samples of raw rubber. Hence, different raw rubbers may give different results when vulcanized in the presence of litharge, while giving identical results in a mixture of rubber and sulphur only. The experiments made with litharge are incorporated with the results given below.

Three Mixings Used

Three mixings were used as follows:—

(a) Rubber with excess of sulphur.
Rubber 90 parts, sulphur 10 parts.

(b) Rubber with excess sulphur and zinc oxide.
Rubber 90 parts, sulphur 10 parts, zinc oxide 5 parts.

(c) Rubber with restricted sulphur and litharge.
Rubber 100 parts, sulphur 6 parts, litharge 7 parts.

Seven parts of litharge require one part of sulphur for complete reaction and conversion to lead sulphide, and consequently, assuming the reaction complete, there will remain over five parts of sulphur for combination with 100 parts of rubber, or about half the proportion used in the two first mixes.

The rubber used consisted of a series of samples prepared in slab form and coagulated with varying proportions of acetic acid, sulphuric acid and alum (see *Bulletin*, March 1922, p. 134). There were four samples for each coagulant, but insufficient of the samples prepared with acetic and sulphuric acids for complete tests. The samples with these acids were therefore united, giving six samples and 18 mixings in all.

(1) Acetic acid coagulated latex in the proportions 1/1,200, 1/300, 1/150 and 1/75.
(2) Sulphuric acid coagulated latex in the proportions 1/2,000, 1/500, 1/200, 1/125.
(3) Alum coagulated latex in the proportion 1/400.
(4) Alum coagulated latex in the proportion 1/100.
(5) Alum coagulated latex in the proportion 1/50.
(6) Alum coagulated latex in the proportion 1/25.

The mixtures were vulcanized in all cases for three hours at 138 deg. Cent., the load stretch curves and the coefficients determined in the usual manner. In order to obtain elongation figures which would be comparable and include those with relatively high elongations, these figures were compared at a load of 60 kilos per sq. cm.

What Was Discovered

The first table gives the actual figures obtained. The second table gives the ratios between the figure for the ordinary rubber-sulphur mixing and those containing zinc oxide and litharge respectively. If the ratio is constant it indicates that the effect of adding zinc oxide or litharge is merely to shift the position of the load strength curve to the same degree or to alter the coefficient proportionately. If, however, the ratio varies, it indicates that the rate of cure or rate of vulcanization, however measured, will vary with the ingredients and the relative rates of cure of two samples may be altered by varying the nature of the ingredients of the mixing.

TABLE I.—FIGURES RECORDED.

Acetic acid—	R.S.	ZnO.	PbO.
Elongation	(1) 729	(1) 559	803
* Co-efficient	5·22	5·11	4·11
Sulphuric acid—			
Elongation	(5) 968	(5) 714	773
Co-efficient	2·07	2·98	4·10
Alum, 1/400—			
Elongation	(2) 792	(2) 578	730
Co-efficient	4·33	4·50	4·30
Alum, 1/100—			
Elongation	(3) 890	(3) 656	780
Co-efficient	1·94	2·56	3·72
Alum, 1/50—			
Elongation	(4) 930	(4) 730	770
Co-efficient	1·35	2·96	3·36
Alum, 1/25—			
Elongation	(6) 985	(6) 730	793
Co-efficient	1·52	2·77	3·50

* The coefficient in the case of the rubber compounds with zinc oxide and litharge was arrived at by determination of the sulphur after extraction with acetone, followed by extraction with ether and hydrochloric acid to remove any metallic salts formed during vulcanization. Although lead sulphide is formed in quantity, it is usually found that only traces of zinc sulphide are produced. In the present instance, however, an appreciable evolution of hydrogen sulphide was obtained with some of the samples compounded with zinc oxide, pointing to the probable formation of zinc sulphide in appreciable amounts.

TABLE II.—RATIOS.

Acetic acid—	R.S. ZnO.	R.S. PbO.
Elongation	1·30	0·91
Co-efficient	1·02	1·27
Sulphuric acid—		
Elongation	1·35	1·25
Co-efficient	0·70	0·51
Alum, 1/400—		
Elongation	1·35	1·09
Co-efficient	0·96	1·00
Alum, 1/100—		
Elongation	1·35	1·14
Co-efficient	0·76	0·52
Alum, 1/50—		
Elongation	1·29	1·27
Co-efficient	0·46	0·40
Alum, 1/25—		
Elongation	1·34	1·35
Co-efficient	0·55	0·43
Average—		
Elongation	1·33	1·17
Co-efficient	0·74	0·69
Maximum variation from mean—		
Elongation	2	19
Co-efficient	38	63

The Effect of Zinc Oxide

(1) Taking elongation at a given load for a mixture of rubber and sulphur 9/1 (R.S.) and the same mixture with the addition of zinc oxide (ZnO) the ratio remains the same for all specimens whatever the rate of cure. Consequently the lie of the load stretch curves corresponds for all specimens and the addition of zinc oxide only affects the result by a uniform and proportional shifting of the position of the curve and alteration in breaking strain. This confirms the previous report, *Bulletin*, October 1921, p. 395, the curves (marked thus, o) running almost exactly parallel.

(2) If, however, the coefficients be compared instead of the elongations, the ratio is no longer the same for all the specimens. In the presence of zinc oxide, the coefficient does not fall to the same extent as in a simple rubber and sulphur mixing, so that with very slow curing specimens, such as those produced with a large excess of alum, the coefficient of the rubber-sulphur compound is only one-half of that containing the zinc oxide. A reference to the above mentioned earlier report, p. 395, will show that the curves (marked thus, x) differ in shape and cut one another.

(3) As regards the effect of litharge and a reduced proportion of sulphur—the ratio of elongation at a given load for the R.S. and litharge (PbO) compounds is not constant as in the case of the zinc compounds. The elongation of the litharge compounds is less susceptible to reduction in rate of cure (as produced by excess of coagulant) than the R.S. compounds.

(4) The coefficients are parallel with those of the zinc compounds, but the reduction of the coefficient with increase of coagulant is more marked.

Taking proportionality in rate of cure as modified by (*a*) addition of zinc oxide to the ordinary rubber sulphur mixing (*b*) addition of litharge and reduction in the proportion of sulphur—

(*a*) Zinc oxide produces some modifications mainly in regard to the coefficients, but the specimens fall into approximately the same order as in the rubber-sulphur mixings.

(*b*) Litharge produces considerable modification, and this applies both to the coefficients and elongation, *i.e.*, position of the load stretch curves, and the specimens do not fall into the same order as in the rubber-sulphur mixings. Thus, the acetic acid coagulated rubber gives the lowest figure for elongation (that is, cures the fastest), both in the rubber-sulphur and zinc oxide mixings. On the other hand, the acetic acid coagulated rubber gives the highest elongation in the litharge mixings, that is to say, cures the slowest. Judging from an ordinary rubber-sulphur mix, or one containing zinc oxide, we should conclude that of the samples under consideration that coagulated with acetic acid cures faster than those coagulated with sulphuric acid or alum, while if our test mix contained litharge we should come to an opposite conclusion.

But if we consider rate of vulcanization based on the coefficient, the acetic acid coagulated rubber cures faster than that coagulated with large proportions of alum, not so fast as that coagulated with the smallest proportion of alum, and at the same rate as that coagulated with sulphuric acid.

Most Sensitive Mixings

The simple rubber-sulphur mixings are the most sensitive to change in nature or proportion of coagulant. The addition of a small proportion of zinc oxide (5 per cent) modifies the results and reduces the differences shown, and litharge acts similarly but more powerfully. To illustrate by concrete figures taken from the table, an excess of alum reduces the coefficient of a rubber-sulphur mixing from 5·22 to 1·35, but with the addition of 7 per cent of litharge, a coefficient of 4·11 is reduced to 3·36 only. These figures illustrate the importance of specifying the formula and ingredients when referring to variation in rate of cure. To state that there is a variation, say, of 10 per cent amounts to little in the case of a rubber-sulphur mixing in the proportion 9 : 1, but would be considerable if based on a mixing containing a small quantity of litharge.

It is important to remember that the present experiments were carried out with matured slab rubber, that is rubber prepared in an exceptional manner. It is intended to carry out similar comparative tests with different mixings, using crepe and smoked sheet.

Dr. Geer's Fascinating New Book on Rubber

The Author Predicts an Annual Consumption of 66,000,000 Tires by 1928, for which 440,000 Long Tons of Rubber Will Be Required

THE REIGN OF RUBBER. By William C. Geer, A. B., Ph. D., vice president of The B. F. Goodrich Company, Akron, Ohio. 8 vo, 339 pages, 83 illustrations. $3.00. Published by The Century Company, 353 Fourth avenue, New York City.

ONE of the time-tried and most effective methods of judging the value of a book from the viewpoint of comprehensiveness is to run the eye over the list of chapter headings. By this standard test, which is by no means infallible, Dr. Geer's new popular exposition of the production, uses, and possibilities of rubber is beyond comparison with any similar treatise on the subject and, from the angle of the man in the street or the woman in the home, will be considered the most enlightening book on rubber ever written. The simple, non-technical, easily flowing narrative style lends itself to rapid reading and numerous photographic reproductions help the reader to visualize the text to a large extent.

The chapter headings of the volume are as follows: The Evolution of an Industry; Problems of a Pioneer; Fundamental Methods and Machinery; The Rubber Man's Cook-Book; Raw Rubber; Reclaiming Waste; the Chemistry of Rubber Mixtures; The Bicycle Tire; The Pneumatic Automobile Tire; Transportation by Truck; Waterproof Footwear and Clothing; Broadening the Field of Sport; Power and Light; Communication; Fighting Fire; In the Service of Health; Belting, Packing, and Hose; Rubber in the Home; Gas-Masks; Balloons; The Future of Rubber. An index of subjects covered occupies three and one-half pages at the back of the book.

The Reign of Rubber traces the fascinating history of rubber from the time of its discovery in crude form down to the present day. It tells the story of vulcanization, that union of crude rubber and sulphur which makes available the valuable properties of rubber. It tells how the seeds of rubber trees were taken from South American forests in England and then transplanted to Ceylon, and the beginning there of the great rubber plantations which promise to supply most of mankind's rubber needs. It shows how cotton is the third enormous necessity of rubber manufacturing, ranking with crude rubber and sulphur. The author then traces the uses to which it is put and the needs it fills, from the humble rubber rings, without which domestic preserving is impossible, to the huge rubber tires of trucks as big as railroad cars.

Dr. Geer predicts an annual consumption of 66,000,000 tires and 440,000 long tons of crude rubber, for tires alone, by 1928. In the chapter "The Future of Rubber" he writes:

> Assuming the world to add 1,606,000 automobiles and trucks each year for six years, there would be at the beginning of 1928 22,164,000 cars, a total increase of 75 per cent, a change not only possible but highly probable. At the rate of three tires per car, per year, the rubber industry of the world would supply more than 66,000,000 tires to the consumers in that year. They will be cord tires for passenger-cars, with a marked increase in the use of the solid tire on the bus and the truck. Including inner tubes, we assume a weight of fifteen pounds of crude rubber to the tire. For transportation purposes, therefore, we are justified in a prediction of a use for tires alone of 990,000,000 pounds or 440,000 long tons of raw rubber in 1928. The productive capacity for tires in America today is probably not far from 44,500,000 yearly, and that of all other countries 10,500,000, or a total of 55,000,000. The world will need to increase its capacity before 1928 by 11,000,000 tires a year to care for the demand.

Although the author has happily chosen to treat his subject in attractive popular form there is much in this book that will appeal to every member of the rubber industry. Aside from the historical narrative and the interesting descriptions of plantation and factory processes, the work offers an astonishing survey of the important part rubber has played and is destined to play in the everyday affairs of civilized man. As a record of the industry's past and present and a prophecy of and guide to its future *The Reign of Rubber* should be in the library of every person directly or remotely associated with the development and practical uses of this remarkable gift of Mother Nature.

The Use of Rubber Linoleum

THE idea of using rubber for a floor covering was originated by Thomas Hancock in 1846, but the application of the idea was at first limited to rubber matting and more recently to rubber tiling. With the cheaper cost of crude rubber and the various attempts to discover new uses for rubber, there has developed an interest in the manufacture of rubber floor coverings similar to linoleum.

Perhaps because the use of linoleum is more general in Europe than in America, certain British firms have taken the lead in producing this article. The North British Rubber Co. has developed a rubber carpet, known as "paraflor," which is reversible, soft to the tread, and of generally good appearance. It is furnished in various shades to suit almost any color scheme, and is obtainable in rolls 48 inches wide and 100 feet long. The usual thickness is one-eighth inch, and the weight per square yard at that thickness is about 11 pounds. The retail price in England is about 12s. per square yard.

It is likely that, for the present, rubber flooring will be chiefly used for the purposes to which linoleum is adapted. Whatever market is developed will be in the face of competition with linoleum products, and linoleum enjoys the advantage of a lower selling price. In their desire to keep stocks as low as possible, house furnishers may hesitate to take up a new line in addition to the varied assortments of linoleum and carpets which they now carry.

An unofficial source ventures the belief that rubber floor coverings in roll form may eventually be produced by the Peachey process in a manner requiring much smaller quantities of rubber per square yard than the present rubber linoleum. Such a product would be cheaper and more likely to be introduced into the average home.

Motorcycle and Bicycle Industry of U. S.

The Bureau of the Census, Washington, D. C., reports that in 1919 there were fifty-one factories producing motorcycles and bicycles in the United States, with capital invested of $35,362,150 and products for that year valued at $53,105,895, of which more than half, or $28,609,327, represented motorcycles and parts. A total of 12,200 persons were employed in the industry. Motorcycles to the number of 59,214 were produced; bicycles 470,675.

Wrapped or Molded Hose - Which?

A Comparison of the Merits of the Two Principal Methods Now Employed

By B. W. Elberson

ABOUT eighty-five per cent of the total amount of hose manufactured is made up in smaller sizes, of which a large proportion is used in outdoor work, often on jobs that subject it to pretty rough handling. As far as durability is concerned it does not matter much whether the vulcanizing is done by molding, or by wrapping and steam curing, provided the friction is good (as laps and plies must adhere firmly) and the outer covering is of tough, pliable stock, slow to deteriorate with age.

Woven molded hose, for which owing principally to its durability the demand is ever increasing, is as a factory proposition quite different from the wrapped variety. A good rubber composition has always been used in its construction, this being necessary because during the process of manufacture the rubber plies are stretched considerably to bring them to the required thinness. The tube, also, which is run with a small bore and thick wall, so that it will be as firm and round as possible during braiding and subsequent operations, must be made of a compound good enough to withstand expansion to twice its original diameter when in the mold.

Following each ply of braiding the product is drawn through a tubing machine and to obtain the thinnest possible covering it is pulled through much faster than the machine runs the rubber; this is done by a pulley attached to the front of the machine and geared for differential speeds. From time to time a little air is let into the tube to keep the work well rounded for easy coiling and to prevent pinching and creasing. The structure when ready for the mold will consist of five or more plies of rubber and braiding, and as no cement or solution has been used these are but loosely laid together. Vulcanizing is done in a lead tube which forms around the hose as it passes through a machine operating much on the principle of a rubber tuber, the diameter and thickness of wall of this tube, about ⅛ inch, being exactly determined by dies. As the metal carrying the enclosed hose exudes from the machine it is water cooled and wound on large metal reels. Forty or fifty pounds of water pressure are then introduced and the curing done in a steam vulcanizer.

Maximum Care Needed with Molded Hose

The manufacture of this type of hose demands a maximum of care from start to finish. The stock from the tube must be well refined and free from all hard particles, so that when the hose is covered by the mold and water pressure applied no leaks will develop. One or two leaks would cause the loss of the whole length or at least damage it greatly. Also the compound used for covering the braids must be carefully prepared to obviate loss of time on the tuber occasioned by tears or splits. Extremely accurate tubing machine handling is essential, exactness as to bore and thickness of wall necessary to prevent variations in the inner diameter and weight of the finished hose. The braiding operation has to be pretty closely watched for variations in yarn, breaks, and bad spacing.

The labor cost in making molded hose is greater than for the wrapped variety. While all rubber processes are rapid, weaving and lead covering are comparatively slow; also constant gaging and inspection tends to retard the work, and the lifting and trucking, indispensable in the bulding of hose by alternate tubing and braiding operations, is a considerable item of expense.

Losses by reason of faulty workmanship or accident are greater than with the wrapped method of manufacture, especially in the vulcanizing department. Here as with all rubber articles finished by molding the percentage of imperfections runs higher than for steam cured goods.

Wrapped Hose a More Economical Product

Compared to all this the production of wrapped hose is simple and straightforward. Calendering the stock, which corresponds to tubing it for the molded product, is easier and fully as rapid. Frictioning and cutting the fabric and rolling it on the pole are much more quickly accomplished than weaving circular plies, one by one, of the same length. Winding on wrappers and, after curing, removing them and the hose from the pole are speedier operations than running a lead tube, curing, and then splitting it off the finished product.

Whether it is possible to produce wrapped hose that will wear equally as well as the molded article depends largely upon the quality of the rubber compound used in constructing the former. In the matter of cost—plant, maintenance, and labor—the older method certainly has an advantage over the newer; and with a continuance of low-priced crude rubber, manufacturers of wrapped hose can afford to use it to an extent that will enable them to produce very durable goods.

The Uruguayan Rubber Market

(By U. S. Consul David J. D. Myers, Montevideo.)

About 75 per cent of the rubber trade of Uruguay consists of automobile tires and tubes. The French Michelin tire almost evenly divides the market with two American makes, while a close observer of the market estimates that the German Continental is supplying nearly one-sixth of the present imports of tires. The 32 x 3½ tire, which was common two years ago, is no longer among the leading types. The 33 x 4 straight-side type is now popular.

An increase is to be noted in the sale of canvas rubber-soled shoes in the interior of Uruguay. The largest importer of rubber goods in Uruguay states that more than 75 per cent of the tennis shoes sold in the interior are worn by people at their work, and attributes this fact to the neat appearance and durability of the imported shoe in comparison with the cheap locally made alpargata.

Since 1919 the market for rubber heels has been practically taken over by American manufacturers, three well-known American brands dominating the market at present. Small quantities of rubber cushions for billiard tables have been purchased from the United States in the past two years. Europe formerly supplied the demand for rubber heels and for billiard cushions.

Testing Golf Balls by X-Rays

"X-rays in the Rubber Industry" was the title of a lecture delivered recently by C. L. Abernethy to the Foremen's Association of the North British Rubber Co., Edinburgh, when the various uses of X-rays were shown by means of lantern slides. The slides were grouped in four sections: (1) photographs of the various parts of an X-ray plant, showing also protective devices against the harmful effects of X-rays on the body; (2) surgical slides, showing how X-rays penetrate the body and cast shadows of bones and any foreign matter; (3) general applications, showing X-ray photographs through wood, leather, aluminum, concrete, vulcanite, etc.—photograps of the "clincher cross" and other tires were shown; and (4) golf balls. In the last mentioned section, photographs of different types of golf ball were thrown on the screen, the different features of each type were remarked upon, and the importance of such a test was emphasized. The method of examining rapidly a large number of golf balls in routine test work was also shown in a photograph of the apparatus as set up for this purpose in the company's physical laboratory.

ABSTRACTS

Technical — General — Commercial

The Coefficient of Vulcanization of Rubber

An investigation was made to determine to what extent, if any, the percentage of sulphur combined with the rubber at the standard cure adopted, is depedent upon the nature and the amount of the usual accessory substances present in the raw rubber. Twenty four samples were examined, six of crepe rubber, six of Ceylon sheet rubber from trees 10 years old, and six of sheet and crepe rubber from trees 20 years old. The samples were washed, dried, analyzed, vulcanized and tested in the usual manner. The free sulphur was determined by extraction with acetone. In order to obtain the combined sulphur, the free sulphur was subtracted from 10 per cent, which was the amount of sulphur used in these mixes. The accuracy of these methods was checked by separate determination of the free and combined sulphur.

The standard cure selected was that which gave a stress-strain curve passing through 830 per cent elongation under a load of 1.36 kilograms per square millimeter. It was found that the vulcanization coefficient of crepe rubber at the standard cure was distinctly less than that of the sheet rubber. The vulcanization coefficient of rubber from the older trees is slightly less than that of the rubber obtained from the younger trees and the results are decidedly more uniform. There is no relation between the time of cure and the vulcanization coefficients of the individual rubbers.

The conclusions drawn from this series of investigations are as follows:

1. The amount of combined sulphur at the standard cure depends on the way in which the rubber is prepared, upon the trees from which the latex is obtained and also to a less extent upon the unexplained variations in the finished rubber from time to time. In the samples which were tested the maximum variation did not reach one per cent of the combined rubber.

2. For a series of rubbers, as the average time to cure increases, so the average amount of combined sulphur at the standard cure decreases.

3. The amount of combined sulphur at the standard cure for rubber of the same form, and from the same trees, varies approximately as the amount of resin constituents of the rubber varies.

4. The resin of crepe rubber has very little influence on the rate of combination of rubber with sulphur. The resin of sheet rubber acts as a mild accelerator while the resin of slab rubber contains a strong accelerator. The resins of slab and sheet rubber increases the vulcanization coefficient of crepe rubber at the standard cure more than does the resin of crepe rubber.

5. Whether the time of the cure of the rubber-sulphur mixture (90:10) is estimated by chemical or physical means, the results are approximately the same as long as similar forms of rubber are compared. The differences are larger when dissimilar forms such as sheet and crepe are compared.

Natural and Artificial Aging of Rubber

Strips of vulcanized rubber were inclosed in a sealed glass bulb, which was filled with oxygen. The bulbs were maintained at a temperature of 77 degrees C for ten days. The rubber gave a positive pyrrole test, which indicated the formation of laevulinic aldehyde. This shows consequently that "artificial aging" gives rise to the same products as the natural process at the ordinary temperature, but in Geer and Evan's method for the former the current of air removes the laevulinic aldehyde as it is formed. For further details, see *India Rubber Journal*, 1922, volume 63, page 814.

Determination of Sulphur in Vulcanized Rubber

In the course of an investigation of the endurance of various rubberized ballon fabrics, methods were developed for the determination of sulphur, both in the free and combined state in the rubber. The sample of rubberized fabric can be tested directly without the necessity of scraping off the rubber coating, and equally as accurate results can be obtained in both ways of working. In the method of analysis for combined sulphur, the nitric acid method was varied slightly. The modification consisted in the addition, in the later stage, of small amounts of potassium permanganate, to complete the oxidation within a shorter time. When 0.5 to 3.0 grams of the original material is taken for analysis, about 2 grams of powdered potassium permanganate are required. This amount of the reagent is added 0.25 to 0.5 gram at a time. The end of the reaction is marked by the formation of a permanent black precipitate of manganese dioxide. The rest of the method is the same as the regular analysis. Care must be taken to make the conditions of precipitation of barium sulphate as propititious as possible as only a very small weight of the precipitate is obtained. Although the method is intended for combined sulphur determination only, nevertheless, where the amount of total sulphur is not large, it can also be used to good advantage in the analysis of total sulphur.

Free sulphur which is the sulphur that can be extracted from the rubber by acetone at or near its boiling point, is determined by oxidation with neutral permanganate of potassium in the acetone solution. The entire quantity of permanganate is added all at once to the acetone solution. About 0.5 to 1 gram of potassium permanganate is used to 50 to 60 cubic centimeters of the acetone solution. The mixture is shaked and allowed to stand for a half an hour or so at the room temperature. If the deep permanganate color disappears, a little more of the salt is added until finally the solution remains colored permanently. The acetone is removed by distillation. The rest of the method is the same as the regular method. Accurate results are obtained.—*Jor. Soc. Chem. Ind. 1922, 251-2 T.*

Relation between Rubber and Paints

In the past there have been published several abstracts in this section on the use of rubber in the manufacture of new and novel paint preparations. Much interest is attached to the parallel, drawn by M. F. G. Breyer, of the close relationship between the properties of rubber and paints. He states that in each of these substances the pigments play the same role. The reasons for his conclusions are: 1. Both rubber and paint are suspensions of solid particles, having a maximum diameter of about 5 microns, in a plastic medium.

2. Each of the materials is used in a modified form in the case of the paints, this modified form is attained by the use of driers; in the case of rubber it is brought about by the vulcanization process.

3. The utility of the paints and of the rubber is measured principally by their elastic properties.

Molecular Weight of Rubber

C. Harries and F. Evers in the Wissenschaftliche Veroeffentlichung Siemens-Konzern, 1921, 1, pages 87 to 95 describe a new chemical method of determining the molecular weight of rubber. This is a very scientific treatise. It is concluded that the molecule of rubber contains from 35 to 40 atoms, preferably the latter.

Recent Patent for Recovering Rubber Solvents *

The Boecler Apparatus Saves the Solvent which Hitherto Has Been Lost into the Atmosphere from the Various Machines

IN the treatment of rubber mixtures in sheet making machines and in calender machines for the production of rubber textures in the form of rubber asbestos sheets and also in the treatment of rubber goods in other forms of apparatus, the solvent of the rubber, such as benzine, generally is permitted to escape into the work room and is lost except where means are provided for recovering the solvent.

It is the object of this invention to provide improved means for recovering the solvent from rubber mixtures during the making of rubber asbestos sheeting materials and during the coating of fabrics with rubber and in other processes where dissolved rubber or rubber mixtures are applied upon surfaces or made into articles, while they are being worked upon in the machine by condensing or precipitating the solvent and collecting it in the form of a liquid. For this purpose a casing is provided which completely encloses the machine during working and this casing is so constructed and so cooled that a circulation of the vapors is maintained and the vapors are rapidly and more completely precipitated or liquefied, so that can not escape from the casing as the latter is completely closed so that no part of the solvent or vapors is lost nor are the people who operate the machine injured by the vapors.

In the accompanying cuts, Figure 1 is a side elevation, partly in section, of a sheeting machine, Figure 2 is a cross section thereof, Figure 3 is a front elevation, partly broken away, of a calender machine for making rubber-asbestos sheets, and Figure 4 is a cross section thereof.

Both the machines are shown with the devices for recovering the benzine applied thereto. In the sheeting machine illustrated in Figures 1 and 2, the work table *a* is mounted on supports *b*. This work table is completely surrounded by the casing *c*, although the supports *b* project there-through, and the table divides the casing into two compartments connected only by narrow passageways at the sides close to the walls. The sides of the lower compartment are inclined to permit of an easy down-flow of the benzine condensed thereon. The walls of this compartment are made double in the lower part to form a cooling jacket *e*, so that water for

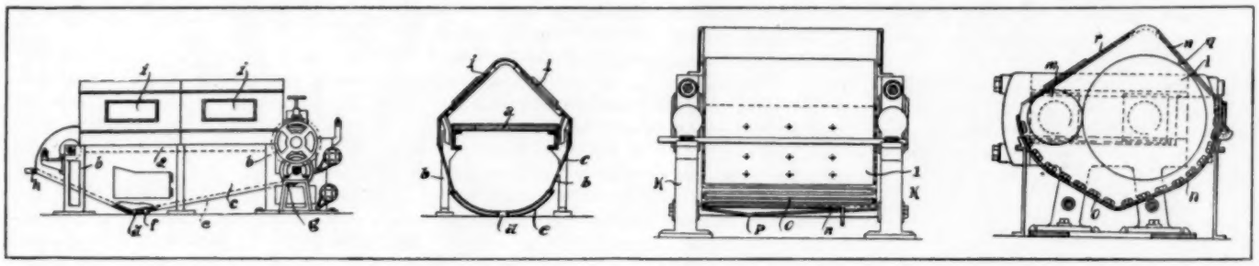

FIG. 1 FIG. 2 FIG. 3 FIG. 4

a very high percentage of the solvent employed in the rubber used in the machine is recovered for subsequent use.

In the preferred construction the enclosing casing is divided into two compartments by the heated work table or else by the rollers which operate on the stock, the compartments being connected by more or less restricted passage ways at the sides near the walls of the casing. Only the walls of the lower compartment of the casing below the work table or rollers are cooled by suitable means such as water circulating tubes or a water jacket, in order to establish circulation within the casing and to condense the vapor of the solvent in the lower compartment.

Owing to the fact that the casing is practically completely closed the vapors of the solvent will be at a somewhat lower pressure in the lower compartment or lower portion of the casing as compared with the upper compartment or upper portion of the casing above the work table or rollers, and this will facilitate the evolution, collection and condensation of the vapors. The vapors of the solvent are denser than the air and therefore at the commencement of the treatment they sink to the bottom and they are to a certain extent drawn into the lower compartment or the lower portion of the casing. If the apparatus is completely filled with solvent vapors or gases these are cooled to a certain extent on the upper surface of the apparatus, but as the warmer gases are always being evolved, these cooled gases or vapors descend around the walls into the lower compartment or the lower portion of the casing toward which they are to a certain extent drawn, as a partial vacuum is produced in the lower portion of the casing by the condensation of the cooled gases by the water cooled walls. The liquid (condensed solvent) which collects in the bottom of the casing can be drawn off through an opening at the lowest part thereof. The solvent or its gases

cooling purposes can be contained therein. For the admission of the cooling water an opening *f* is provided in the cooling jacket, and for the exit of the water two openings *g* and *h* are provided.

The upper compartment of the casing *e* above the table *a* is enclosed by transparent plates *i* which permit of continual supervision of the operation.

In the case of machines, of which the working appliances are in the form of cylinders, as in calender machines (Figures 3 and 4), the device for recovering the solvent can also be arranged to surround the working appliances completely. In these machines cylinders *l* and *m*, of which one (*l*) is heated, are mounted between the lateral supports *k* and driven in any suitable manner. The cylinders are enclosed on all sides in a casing *n* which is mounted between the lateral supports, and the cylinders have the effect of dividing this casing into two compartments connected only by narrow passage-ways at the sides close to the walls. The inclined side and bottom faces of the lower compartment are covered with cooling tubes *o* which correspond with the cooling jacket of the sheeting machine illustrated in Figures 1 and 2. Also in this case an opening *p* is provided for the outflow of the benzine. In order that the cylinders *l* and *m* may be accessible, the casing is provided with plates *q* and *r* at the top.

The operation of the device is as follows:—

The benzine vapors formed in the sheeting machine or in the calender machine collect in the upper compartment of the casing *c* of the sheeting machine (Figures 1 and 2) or casing *n* of the calender machine (Figures 3 and 4); as they cannot escape, the vapors become partly cooled and in consequence of their weight and density and the partial vacuum formed in the lower compartment they pass into this compartment wherein they are completely cooled and condensed by the cooling jacket *e* or the cooling tubes *o*. The liquid thus formed flows out through the opening *d* of the sheeting machine, or through the opening *p* in the calender machine.

* *U. S. Patent No. 1,426,949 issued to Albert Boecler, Malmo, Sweden. Assigned to The Benzine Condensation Co., New York City.*

NEWS OF THE INDUSTRY

Firestone Back from Europe

Harvey S. Firestone, president of the Firestone Tire & Rubber Co., Akron, Ohio, returned home on Oct. 3 after spending two months in England and France.

"Conditions in Europe are better than in 1920, but progress has been very slow and will undoubtedly continue to be so until the political situation becomes settled," Mr. Firestone said. "England seems to be improving from a business standpoint, although she is still burdened with unemployment.

"The attitude of Europe toward Americans is very friendly and cordial. While some of the leaders may disagree with our foreign policies, the people themselves like Americans and their friendship.

"American made tires have an unlimited potential market in Europe that will continue to increase in proportion with the efforts of American producers to take advantage of the opportunity in the proper manner.

"Tire plants on this side of the Atlantic are putting out a tire of superior qualities to those of the European tire builders and are selling them at a better price with regards to quality. As a result we are meeting foreign competition with great success."

While in England he was the guest in London of Sir Campbell Stuart, managing editor of the *London Times*, and also of Marshall Stevens, M. P.

General's Surplus $892,126

The financial statement of the General Tire & Rubber Co., Akron, Ohio, as of Aug. 31 shows total assets of $3,339,667, including cash amounting to $365,769. The surplus increased from $200,000 to $892,126. Accounts payable were only $115,363. General Manager O'Neil said:

"This will be our greatest year. We are now planning to double the capacity of our plant, which can be done at low cost because of the compactness and arrangement of the plant and specialized machinery developed by this company."

New Chemical Concern

The new chemical firm of Callahan & Co., putting out a line of colors, fillers, and chemicals known as Calaco products, has opened a warehouse and office at 531 Peoria street, Chicago. They are importing directly Turkey umber, Italian sienna, French ochre, red oxide, Van Dyke brown, and other paint colors and pigments. The firm are American agents for several European manufacturers and exclusive selling agents for some American makers.

Lord Grimston in Akron

Lord Grimston, president of the British Industrial Rubber Products Limited, who represents the Miller Rubber Co., in England, left Akron Oct. 10 after conferences since Oct. 4 with local rubber men.

"More than $1,000,000 worth of Akron tires were sold in England last year through my organization", Lord Grimston declared. "This marks a significant inroad into British business and has made many English firms take notice of American competition."

Commenting on the present economic and political situation in England, Lord Grimston declared that Britain is still feeling the effects of the war.

"Unemployment is still one of the biggest problems confronting the government. There are about 2,000,000 men out of work in England and each receives government pension of nearly $6 per week," he said.

Lord Grimston came to Akron accompanied by John Cooper, also from London, managing director of Industrial Rubber Products Limited.

U. S. Rubber Dividend

Directors of the United States Rubber Company declared on Oct. 5 the regular quarterly dividend of $2 on the preferred stock, payable Oct. 31 to stock of record Oct. 16. This preferred issue, as well as the common stock of the corporation, recently has been under pressure because of rumors which have been going the rounds that the dividend would be passed. Officials of the corporation said at the time that there was no basis for such rumors, and the preferred issue of the corporation has had an appreciation in market value of approximately 10 per cent during the first few days of October.

Rubber Exhibitors at Brazilian Centennial

Among the United States industrial exhibits at the Brazilian Centennial Exposition in Rio de Janeiro, which opened Sept. 7 in the presence of Brazil's president and our Secretary of State Hughes, are the following American concerns of interest to the rubber industry:

Goodyear Tire & Rubber Co., Pennsylvania Rubber Co., B. F. Goodrich Co., American Tire & Rubber Co., Texas Gulf Sulphur Co., General Motors Corp., Ford Motor Co., Autocar Co, Dodge Bros., Indian Motorcycle Co., L. E. Waterman Co., Rubberoid Co., All-American Cables, Inc.

Goodyear Answers Weiss Suits

A motion was filed in the Akron common pleas court Oct. 9 by attorneys of the Goodyear Tire & Rubber Co., seeking an order of the court to require Laura L. T. Weiss, Cleveland, to furnish security for costs in her suits to set aside the $30,000,000 refinancing of the company by New York and Cleveland bankers.

The motion will be heard by Presiding Judge W. J. Ahern, Oct. 21. The motion is predicated on the claim that the plaintiff is a non-resident of the county and that courts of this country have no jurisdiction.

On Oct. 11 the company filed answers to the four suits attacking the reorganization and refinancing plan as affected in May 1921.

The answer states that all securities issued were properly authorized and disposed of on the best terms possible in order to satisfy the creditors and to preserve as much value as possible for the stockholders.

The large savings accomplished by the new management are emphasized, including payment of the temporary loans that led to the Goodyear difficulties, the auditing and adjusting of the claims amounting to nearly $80,000,000 in which large reductions were secured, and the absorption of losses not provided for in the reorganization plan, amounting to nearly $14,000,000, and the securing of reductions in the company's outstanding obligations.

The reorganization of the company has resulted in a large saving of expense and a great increase in efficiency, the answer maintains. It is asserted that the contract of Leonard Kennedy & Co. was a profitable and advantageous one for the company.

The answer states that the plaintiff received from the company a copy of the reorganization plan, and made no attempt to prevent its being carried out until after the reorganization and refinancing had been in effect for a year.

In its answer the company points out that the $30,000,000 in first mortgage bonds, the rate of interest and premium on which were alleged to be usurious, were made, sold, and delivered in New York City where statutes forbid usurious interest notes.

Hood Sales Jump a Million

The Hood Rubber Co., Watertown, Mass., reports sales of tires and footwear for the first nine months of this year at $18,100,000 as compared with $17,218,416 for the same period in 1921. Bank loans are being reduced and no new financing has been planned.

Rubber Cement Litigation Ends

The final chapter of a trade mark controversy which has been in the federal courts for a number of years ended in the United States District court in Boston recently when Judge Johnson decided that William Ogden Hadley, of Lynn, Mass., grandson of the Hadley who was the first man to make rubber cement seventy-five years ago was in 1907 the originator of a rubber cement for sticking leather to leather, and rubber to rubber or leather. The winner of the suit was the Chemical Research Co. of Lynn, with which the present Hadley is associated, and the loser the St. Louis Rubber Co. of St. Louis, Mo.

It appears that the Lynn man first put the "3 in 1" brand label on Hadley's, the cement he had originated, advertising it extensively under his name "3 in 1 Combination Cement" from 1907 to 1912.

In that year he became associated with Edward F. Beach of St. Louis and allowed the latter to use the name in connection with the St. Louis Rubber Cement Co., with the understanding that when Mr. Hadley severed his connection with that company, Mr. Beach would stop using the brand name.

It appears that instead of doing so Mr. Beach registered the "3 in 1" brand in the patent office, making the statement he was the originator. In the meantime Mr. Hadley joined the Chemical Research Co. and the St. Louis company brought suit against it when it put out the "3 in 1" cement.

Rubber Paving for Edinburgh

The North British Rubber Co., Ltd., has offered to pave certain streets of Edinburgh free of charge with rubber paving blocks, and the city committee on streets and buildings has officially recommended that a portion of Fountainbridge and Gilmore Park be laid with these blocks. The experiment will be watched with keen interest.

The company has also offered to supply free rubber paving blocks to the city of Glasgow and a section of Buchanan street has been selected for the purpose of the test.

Tube Plant for Delaware, Ohio

A new puncture-proof tube will soon be manufactured in Delaware, Ohio, by the Rainbow Tire & Rubber Co., according to C. A. Morrison, president of the company. Construction work on the plant will be pushed to completion and operations soon started. Mr. Morrison on a recent trip to Michigan said that he had demonstrated the merits of the tube to these automobile men and secured their interest in the concern:

C. Harold Willys, president of the Willys-St. Claire Motor Company; Frank Book, treasurer of the same company; A. C. Mason and M. C. Day, both with the Mason Motor Truck Company, at Flint, Michigan, and William Ford of Dearborn, Michigan, a brother of Henry Ford.

Mohawk Issues Novel Road Guide

The first section of a recently inaugurated road guide service has just been issued by The Mohawk Rubber Co., Akron, Ohio. This guide differs from the ordinary road map in that it takes into consideration road surfaces and elevations.

It is called the Hobbs Road and Surface Guide. The first edition covers the territory from Cheyenne and Denver to Chicago.

Each section includes: detailed road conformation and authentic road surface conditions graphically charted by mile sections—even shows where chains are needed in wet weather; reliable garages along the route maintaining machine shop, day and night service, tow-car service, battery service or any of these services—each with its telephone number and current labor rate stated; best hotels and restaurants—luxurious, moderate or simple as to conveniences and rates—with prices indicated; gas and oil stations between towns plainly marked and tourist camp grounds enroute indicated and facilities—water, light, stoves, police protection, etc.—of each enumerated.

It is issued in convenient folder form easily held in one hand with everything the motorist needs to know directly before him.

The next sections to be issued will cover Chicago to Jacksonville and The Dixie Trail.

"Viaduct Day" Parade in Akron

Oct. 12 was known as "Viaduct Day" in Akron, Ohio, when the new North Hill Viaduct was opened with elaborate ceremonies in which practically the entire rubber industry of "The Rubber City" participated. The parade was one of the features of the day. Many of the leading rubber manufacturing companies had decorated floats in line, and hundreds of officials and workers took a prominent part in the event.

A correspondent of the Akron Press suggests that at one end of the Viaduct there should be a permanent rubber exhibit. This seems such a sensible and practical suggestion that it is hoped the rubber manufacturers of Akron will adopt it. It would certainly add to the city's attractiveness and prove a permanent advertisement for the rubber industry.

Goodyear Plant on Full Time

Following the resumption of work at the Ford plant at Highland Park, Mich., plant No. 2 of Goodyear at Akron returned to its full time schedule which has been temporarily reduced. Production of Ford tires for original car equipment is now 6,000 daily and the total tire output of the Goodyear factories is about 20,700. It is thought that this production total will continue until November at least.

Rubber Machinery Plants Busy

Manufacturers of rubber machinery and equipment in Akron and vicinity are encouraged over present business conditions, according to current reports. Survey of the field shows several factories increasing production and building and maintaining fair production records.

Akron Standard Mold is completing an addition to its plant to cost $20,000. The addition will give 50 per cent more floor space.

Bridgewater Machine Co. reports an increase in business.

Adamson Machine Co. reports business above 60 per cent normal.

Akron Equipment Co. officials report business 75 per cent of capacity.

Akron Rubber Mold is operating full time with the engraving department operating three shifts.

Vaughn Machinery at Cuyahoga Falls reports business good and recently received a large order from an Oregon concern.

Youngstown Plant Resumes

The Republic Rubber Co., which has been making tires and tubes at its Canton, Ohio, plant, has resumed the manufacture of tire casings in its Youngstown plant which has a maximum capacity of 3,000 casings daily. The mechanical rubber goods and inner tube departments have been working since early this year. Operations are progressing favorably under Receiver C. H. Booth. The sales force has been recognized and the company seems to have a bright outlook.

Opens 60 Houses to Public

A group of sixty houses at Seneca Heights, a suburb of Jeanette, Pa., has been thrown open to the public, for rent or purchase, by the Pennsylvania Rubber Co. whose factory is located in that city. This action by the company follows requests by city officials and residents for more homes to relieve the housing situation there. The houses are of five and six room construction and were built for the use of officers and employes of the company. The new suburban colony is to be named Parueo Park, in honor of the company's name.

Company for Peachey Process

The Duro Rubber Products, Ltd., with a capital of £20,000, has been formed in London to apply the Peachey cold vulcanization process to rubber soles, mats, tennis courts, and miscellaneous rubber articles. The directors are T. C. Owen, of Rowe, White & Co., whose vulcanizing plant at Willesden will be taken over by the company; W. J. Burton, managing director of the City of London Real Property Co.; Sir Charles Allom, of White, Allom & Co.; and Sir Edward Penton, of Edward Penton & Sons.

Parker in Receiver's Hands

The Bankers Trust Co. of Indianapolis has been appointed receiver for the Parker Tire & Rubber Co. whose plant is at 2655 Allen avenue, that city. The receivership is said to have been brought about by a friendly suit filed by the Central Rubber & Supply Co., a creditor of the Parker company. The complaint did not contend that the company was insolvent but that it was threatened with several suits of a harassing nature.

The manufacture of tires will stop and the receiver will sell at retail all tires which the company has on hand. Bonds to the extent of $150,000 have been issued on the plant which will probably be offered for sale.

Smith Rubber in Bankruptcy

The Smith Rubber & Tire Co., of Saddle River, Bergen County, N. J., has been thrown into involuntary bankruptcy by three petitioning creditors: Peninsular Trading Agency, $1,000; American Zinc Sales Co., $1,000; Alexander Brooklyn, $88. The assets are said to exceed $1.000,000 and the liabilities are $1,317,000 of which $1,127,000 is for common stock issued and outstanding. The company is to be reorganized, according to the attorneys for the creditors.

Batavia Plant to Be Sold

Receiver Woodward of the Batavia Rubber Co., Batavia, N. Y., has been ordered by the court to sell at public auction on Nov. 9 all of the property of the company. Bids are to be reported to the federal court on Nov. 16 for final action. Factory operations are being carried on under P. D. Saylor of Buffalo.

$25,000 Rubber Fire

A fire in a three-story brick building at 618 Penn avenue, Pittsburgh, Pa., on Oct. 5 burned out the rubber goods stock of the J. G. Garcis Co. in the basement and first floor, causing damage estimated at $25,000. Two firemen were overcome by the dense smoke of the burning rubber.

36,000,000 Tires in 1922

According to an estimate made by the Miller Rubber Co., the production of American tire factories in 1922 will reach or exceed 36,000,000. This is said to be 3,000,000 greater than earlier estimates and due to the fact that Akron plants are still maintaining capacity production, or close to it.

Revere to Build

Permission to erect a two-story brick addition, 56 by 76 feet, to its plant at the corner of Eagle and Valley streets, has been issued to the Revere Rubber Company, Providence, R. I.

New Rubber Products Officials

The new offices of the Rubber Products Co., Barberton, Ohio, are C. C. Schultz, president; J. B. Chisnell, secretary; and J. M. Wylie, treasurer. The former president was W. A. Johnson. Total assets of the company reported on June 30 this year were $1,103,076.

Doyle Plant Sold

The Rote Leather Co., a $1,000,000 Delaware corporation, has purchased the plant of the Doyle Rubber Co., located on the Baltimore & Ohio railroad near Akron, Ohio. Machinery will be installed for the manufacture of imitation leather starting about Jan. 1 next.

City Claims $10,000 for Water

The city of Batavia, N. Y., is attempting to collect $10,000 from the Batavia Rubber Co., now in receivership, for water which the city claims was taken directly from the mains without being metered. Hearings in the case were held in New York City before Special Master Mussbaum.

Sues Fisk for $17,500

The Fisk Rubber Co. has been sued in the common pleas court of Lima, Ohio, by Frank P. Sevier, of 730 State street, Lima, in an effort by the plaintiff, a tire salesman, to recover $17,500 which he claims is due him on a salary and commission agreement with the company. In his petition Mr. Sevier avers that he sold $50,000 worth of tires to the Gramm-Bernstein Truck Co. and $300,000 worth to the Garford Co. and that he has not received adequate commissions on these sales from the defendant.

Knox Co. Troubles

Following the resignation of F. D. Spencer, secretary of the Knox Tire & Rubber Co., Mount Vernon, Ohio, who was arrested charged with embezzlement, two former directors of the company, E. Scott Canell and B. E. Frantz, filed damage suits of $100,000 against the company's officials, alleging conspiracy to ruin them and wreck the concern. The plaintiffs were tried and acquitted of embezzlement and fraud charges that had been brought against them.

Rubber Man Sued for Slander

Michael I. Crane, a representative of the United States Rubber Co., has been sued for slander in the sum of $5,000 by Abraham Goldstein, of Cortlandt street, North Tarrytown, N. Y., in the court at White Plains, N. Y. The complainant states that Mr. Crane at a meeting of the North Tarrytown board of trustees last June called him an imposter—a remark which injured his "good name and reputation".

Climax to Buy Rotary Plant?

It is reported that the Climax Rubber Co., Columbus, Ohio, will purchase and place in operation the Licking View plant of the Rotary Tire & Rubber Co. which was sold at a recent bankruptcy sale to the Franklin Mortgage Co. of Columbus for $38,000. The Climax company is now engaged in the manufacture of tires and tubes at Columbus and the Zanesville plant will add considerably to its capacity.

Mason Managers Meet

All of the branch office managers of the Mason Tire & Rubber Co. met in annual convention at the Kent, Ohio, plant during the week of Sept. 25. They visited the new Bedford plant and had dinner at the Hotel Glenerest, Lake Stafford.

Personals

William H. Gilbert, of Woonsocket, R. I., for the past twelve years treasurer of the Pacific coast branch of the U. S. Rubber Co., with headquarters at San Francisco, has been commissioned by his company to visit China and Japan to study trade conditions and extend the company's business in the Far East.

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It is reported that C. W. McKone, production manager of the McKone Tire & Rubber Co., Millersburg, Ohio, has resigned and that K. D. Smith, formerly with Miller, has succeeded him.

• • •

Ulrich Weisendanger has resigned as secretary and director of the Hudson Tire & Rubber Co., and will devote all of his time and effort to the sale of the Haynes car in Yonkers, for which he is agent. Mr. Dickerson, formerly his partner in the sale of this car, will continue in the automobile business on his own account.

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M. E. Dugan, formerly manager of the Goodrich branch store in Akron, has been transferred to the Columbus branch of the company.

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B. F. Piekens, formerly with the Amazon Rubber Co., has been appointed sales manager of the Tuscora Rubber Co., Dover, Ohio.

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E. A. Armstrong has again become associated with the Republic Rubber Co. as general superintendent of the Youngstown plant. Recently he has been with the Cleveland Cord Co.

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W. E. McCormish, formerly manager of the Niles, Ohio, plant of the American Tire Corp., has been appointed development engineer of the tire and tube department of Republic Rubber Co., Youngstown, Ohio.

MARKETS

Cottons and Fabrics

NEW YORK, Oct. 18, 1922

THE Government report on cotton ginning and the last of the official monthly condition reports, issued the first week in October had a stimulating effect on cotton prices which advanced during the two weeks period from the 20 cent level to 23 cents. The continued broadening tendency of trading with such active demand would indicate a still further expansion.

Interest centered particularly in the official condition figure of 50 indicating a crop of 10,135,000 bales. This was somewhat lower than private estimates but the favorable weather conditions that has prevailed since the report tends to encourage the optimistic view of a yield not much under 10,500,000 bales.

The figures on domestic consumption for September are interesting as the report shows 495,344 bales consumed as against 484,718 last year. Mill stocks in January were about one half a million bales over 1921 but on October 1 stocks in mills for the first time in many months fell below the previous year; there being 1,065,000 bales on hand as compared with 1,118,000 last year. Mill demand for the staple has increased since October 1 and has been particularly heavy during the past week.

The cotton statement showed an increase in exports during September over August but even at that the month's shipments were much below 1921; the figures being 368,890 bales as against 532,830 last year. However, the consumption of American cotton by foreign countries for the twelve months ended July 31, 1922, as recently reported by the Department of Agriculture, was 30 per cent greater than during the previous twelve months which must be attributed to the growing industrial recovery of European nations.

Cotton ginned of crop of 1922, up to September 25, totaled 3,883,006 running bales (counting round as half bales) compared with 2,920,392 bales for 1921.

Quotations as of October 18 on the New York Cotton Exchange follow:

	Open.	High.	Low.	Close.	Prev. Day.
Oct.	22.22	22.72	22.02	22.72	22.18
Dec.	22.60	23.06	23.36	23.03@23.06	22.42
Jan.	22.42	22.90	22.22	22.88@22.90	22.27
Mar.	22.50	23.05	22.36	23.00@23.05	22.41
May	22.43	23.00	22.31	22.98@22.23	22.33
July	22.20	22.75	22.07	22.70@22.73	22.18

EXTRA STAPLE COTTON

The only improvement in demand for Egyptians was for the shorter staples. The longer domestic staples including Pimas and Sea Islands have been in quiet demand only. Prices on extra staple cotton, strict middling, f.o.b. New Bedford, are as follows:

1 1/8 inch, 29 to 30 cents
1 3/16 inch, 30½ to 31½ cents
1 1/4 inch, 33½ to 35 cents
1 5/16 inch, 36 to 37½ cents

Egyptian Uppers, medium, 26½ to 28 cents.

Peruvian Mitafifi, 28 to 29½ cents.

High Grade Sak 38 to 41 cents.

Sea Island, extra choice, 40 to 42 cents.

The latest reports from Alexandria would indicate that the supplies of the best grades of Sakel and Uppers will not be less than last year. Sakel is somewhat better in grade and staple than last year while Uppers although satisfactory in grade are not as good in staple as the 1921 crop. The higher grades of Sakel and the low grades of Uppers are likely to be very scarce.

CORD FABRICS			
Combed Sakellarides	.78	@	.80
Carded Sakellarides lb.	.71	@	.73
Combed Peeler lb.	.66	@	.68
Carded Peeler lb.	.53	@	.55
Combed Egyptian uppers lb.	.65	@	.69
Carded Egyptian uppers lb.	.59	@	.63
SQUARE WOVEN			
17¼-ounce Egyptian uppers, combed lb.	.62	@	.67
17¼-ounce Egyptian uppers, carded lb.	.54	@	.58
17¼-ounce Sakellarides, combed lb.	.74	@	.76
17¼-ounce Sakellarides, carded lb.	.67	@	.69
17¼-ounce Peeler, combed lb.	.63	@	.65
17¼-ounce Peeler, carded lb.	.50	@	.55

SHEETINGS—There was a good market for most constructions. For 40-inch, 2.85-yard, some sellers asked 13½ cents. There was considerable business in 40-inch 2.50-yard at 14¾ cents net and 40-inch, 3.60-yard, was in good demand at 12¼ cents.

DUCKS—There was a good demand for enameling duck which has advanced 2 cents a pound. The price for single filling remained the same at 18 to 19 cents card basis, price varying according to the grade. Double filling brought 20 to 21½ cents, card basis. Belting and hose were higher at 40 to 45 cents a pound.

BURLAP—Receipts of burlap in the United States during the first nine months of this year amounted to 717,000,000 yards or a monthly average of 80,000,000 yards. The September shipments from Calcutta to American ports reached 97,000,000 yards—the largest in several months. Of this total only 3,000,000 yards went to Pacific coast centers.

There was very little activity in the local market perhaps due to the reaction at Calcutta at the markets efforts to offset the new tariff rates on burlaps. Prices quoted at Calcutta have for the time being discouraged American buying.

SHEETINGS			
40-inch 2.50-yard yd.	.14¾	@	.15
40-inch 2.85-yard yd.	.13¼	@	.13½
40-inch 3.15-yard yd.	.13¾	@	.14
40-inch 3.60-yard yd.	.12	@	.12¼
40-inch 3.75-yard yd.	.10½	@	—
40-inch 4.25-yard yd.	.09½	@	—
DUCKS			
Belting lb.	.40	@	.45
Hose lb.	.40	@	.45
Enameling lb.	.42	@	.43
Shoe Ducks lb.	.49	@	.51
Single filling lb.	.18	@	.19
Double Filling lb.	.20	@	.21½
BURLAPS (Carload Lots)			
8 -ounce 40-inch 100 yds.	6.50	@	6.55
7½-ounce 40-inch	6.45	@	6.55
10 -ounce 40-inch	8.35	@	8.45
10½-ounce 40-inch	8.50	@	8.65
DRILLS			
37-inch 3.25-yard yd.	.12½	@	—
37-inch 2.75-yard yd.	.14	@	.14¼
37inch 3.00-yard yd.	.13	@	.13¼
37-inch 3.50-yard yd.	.11¾	@	—
37-inch 3.95-yard yd.	.11	@	.11¼
OSNABURGS			
30-inch 7-ounce	.14	@	.14½
40-inch 7-ounce	.14¾	@	—

COTTON EXPORTS FROM ALEXANDRIA

Alexandria, September 22, 1922

	Receipts Alexandria Cantars	Exports in Bales to England	Continent	America	Total Exports Cantars	Stock Alexandria Cantars
This week	45,919	6,234	4,166	1,700	92,015	1,264,757
Same week 1921	93,436	7,553	8,219	7,629	177,329	1,699,479
" " 1920	61,787	1,350	754	—	16,143	484,923
Since 9/1/1922	105,000	10,053	7,619	5,000	172,243	—
Same time 1921	227,173	21,477	15,407	10,889	362,694	—
" " 1920	130,884	2,872	2,939	—	44,163	—

Reclaimed Rubber

NEW YORK, Oct. 18, 1922

No change is reported in the reclaimed rubber situation in either the manufacturing or market phases. The plants are still on a part time basis and buying only for immediate needs. The rise in the price of crude rubber has not as yet affected this branch of the industry.

Quotations of this date are nominally as follows:

Standard Reclaims			
Floating	.12	@	$.13
Friction	.12	@	.13
Boots and Shoes	.09¾	@	.10½
Boots and Shoes (washed)	.12½	@	.13½
Mechanical	.08	@	.10
Hose	.10	@	.11
Tires, truck	.09	@	.10
Tires, auto	.09	@	.10
White	.12	@	.13

Complete Official Report of the British Colon on Plantation Rubber and Rules f

THE supplementary report of the Rubber Committee which has been meeting at the British Colonial Office in London under the chairmanship of Sir James Stevenson, Bart., is now available through the courtesy of the *India-Rubber Journal*.

It is officially announced that Mr. Churchill has approved the proposals, which will be submitted to the Legislatures of Ceylon, the Malay States and the Straits Settlements at an early date.

The committee concluded their report of June, 1922, by stating that they were unable to carry their inquiry further until the attitude of the Dutch was definitely known, as they did not feel justified at that time in recommending the adoption by one or more British Colony or Protectorate of either of the proposed schemes for Government intervention in the Rubber Industry.

Since that report was issued the reply of the Netherlands Government to the proposals for co-operation with His Majesty's Government in legislating to ameliorate the situation in the industry has been received.

The Netherlands Government has decided not to take at present any legislative measures to restrict the production of rubber in the Netherlands.

British Restrictive Measures

The committee have considered the question of whether in these circumstances a policy of restrictive measures in British Colonies and Protectorates alone could be adopted to the advantage of the British Rubber Industry, and in this consideration they have been influenced by the following facts:—

(a) Excessive and increasing production of rubber owing to the failure of the producers to make voluntary restriction effective, with the consequent continuation of the depression in the price of rubber.

(b) The general demand by the leaders of the Rubber Industry, both in London and in Malaya, for restrictive measures if necessary by one or more of the British Dependencies, independently of the Netherlands Government attitude.

(c) The committee have had before them the latest available estimates as to the figures of the world's production and absorption of rubber in 1922, together with figures of existing stocks.

Notwithstanding the fact that the rate of the world's absorption of rubber for the present year shows a substantial increase on the committee's previous figure of 300,000 tons, they have decided to base their recommendations on the figure of absorption mentioned in their previous report, in order that they may err on the safe side.

Former Scheme Revised

The committee have closely investigated the effects of the introduction in British Colonies and Protectorates of legislation framed to bring about more stable conditions in the industry, even without Government control over production in other territories.

Inquiries have been made as to the possibility of securing voluntary restriction of tapping on British estates situated in such other territories in association with any restrictive measures that might be taken in the territories of the British Empire. The committee understands that the Rubber Growers' Association have obtained the assurance of co-operation in this sense from the majority of these estates. This support will proportionately reduce the restriction in British territories necessary to effect a readjustment of supply to demand.

In view of these new considerations and the predominating interest in the Rubber Industry held by British producers the committee have felt a revision of their previous attitude to be justified, and they accordingly desire to recommend that a scheme of Government intervention should be put into operation in Ceylon, the Malay States and the Straits Settlements as soon as possible.

The scheme which they recommend is practically that of Scheme 2 in their previous report, with certain amendments.

Recommendations

(1) The scheme recommended adopts as the standard production the actual output of each producer during the 12 months, Nov. 1, 1919, to Oct. 31, 1920, amplified in accordance with the suggested rules contained in Appendix "A".

(2) In lieu of existing export duties, a minimum export duty is to be levied on that percentage of standard production which is allowed to be exported under this scheme at the minimum rate of duty. The committee recommend that this minimum be fixed at the lowest possible rate, not to exceed 1d. per lb.

If a producer desires to export a quantity greater than that allowed to be exported at the minimum rate of duty, he shall pay an export duty on his total export during that period of 12 months on the following scale:—

	Duty per pound over all.	
	s.	d.
Not exceeding 65% of standard production	0	4
Over 65% but not exceeding 70%	0	5
" 70% " " 75%	0	6
" 75% " " 80%	0	7
" 80% " " 85%	0	8
" 85% " " 90%	0	9
" 90% " " 95%	0	10
" 95% " " 100%	0	11
" 100%	1	0

At the initiation of the scheme the percentage exportable at the minimum rate is to be 60.

When the rubber situation improves so as to justify allowing an increased percentage of standard production to be exported at the minimum rate of duty the minimum would be substituted in its appropriate place in the scale.

(3) Alterations in the percentage of standard production would be governed by the price of standard quality smoked sheet in the London market, and it is proposed that, when the average price for such rubber during three consecutive months has been maintained at not less than 1s. 3d. per lb. London landed terms, the percentage of production which may be exported at the minimum duty would be raised automatically by 5 for the next ensuing quarter. In the event of such average price being maintained at not less than 1s. 6d. per lb., London landed terms, during the whole of three consecutive months, the percentage of production which may be exported at the minimum duty would be raised automatically by 10 for the next ensuing quarter.

(4) Furthermore, in order that the operation of the scheme may secure the desired result, even though for reasons at present unforseen 60 per cent of standard production should prove to be too high, the Committee recommend that if during the second quarter after the initiation of the scheme, or in any subsequent period of three consecutive months, the price of rubber as hereinbefore defined has not averaged at least 1s. per lb., the percentage of standard production that may be exported at the minimum duty shall be reduced to 55, and if

olonial Office Committee, Fixing Export Duties
es for Guidance of Colonial Committees

that reduction is not effective in raising the average price over the following three months to 1s. 3d., then it shall be reduced to 50 at the end of three months, and so on by reductions of 5 per cent at the end of each three months until that average price is secured.

Once the percentage has been lowered it would not be increased except on the basis of a price of 1s. 3d. as aforementioned. If during any quarter when the percentage of standard production that may be exported at the minimum duty is for the time being fixed at not under 65 per cent and the price during that quarter has not averaged at least 1s. 3d. per lb., the percentage for the ensuing quarter would be reduced by 5.

London Advisory Committee

(5) The application of the scheme in their several territories would rest with the local Governments concerned.

(6) The Committee recommended that an advisory committee be appointed in London for the purposes of coordinating the operation of the scheme in Ceylon, Malaya and such other territories as may be involved. They suggest that this Committee should consist of official and non-official members, whose duty would be to advise the Secretary of State on all matters referred to it in connection with the operation of the policy now recommended, and that it should be charged with the responsibility of advising him as to the alterations in the rate of minimum duty required under the scheme.

(7) The committee recommend that the Governments of the territories concerned should set up committees on which there should be representatives of the industry to deal with cases for special consideration in regard to local application of the scheme, and the committee annex to this report rules that would require to be observed by these local committees in the administration of the scheme.

(8) The committee cannot conclude this report without observing that, apart from the financial relief that may be expected to accrue to all rubber producers from the scheme, the discouragement it affords to more drastic tapping cannot but benefit the estates of those managements who are voluntarily or compulsorily associated with the scheme and leave them ultimately in a stronger position than the estates whose trees have been subjected to tapping on an excessive scale.

Rules for Committees

Appendix A to the report gives the rules for guidance of committees as follow:—

In issuing certificates of standard production—

1. "Standard production" shall be the quantity of dry rubber produced from any holding during the period from November 1st, 1919, to October 31st, 1920, provided that if the owner of any holding is unable to declare the output from his holding during that period in the absence of proper records, or if he proves to the satisfaction of the committee that the output from his holding during that period was abnormal from any of the causes referred to in these rules, the committee shall certify some other quantity as the standard production for such holding, in accordance with the rules as set out hereunder.

2. If any owner is unable to declare the quantity of rubber produced from his holding during such period, the committee shall assess the amount to be deemed to be the standard production for that holding, but the quantities so assessed shall not exceed the quantity attained by multiplying the number of acres planted with rubber of each age by the output per acre allotted for trees of each age in accordance with the following table:—

	Maximum output for 12 months. lb.
Under five years	Nil
Between five and six years	120
Between six and seven years	180
Between seven and eight years	240
Eight years and over	320

3. If any owner claims that a portion of his holding is planted with trees which were not tapped prior to 1st November, 1920, he shall be allowed as standard production in addition to his output from 1st November, 1919, to 31st October, 1920, an amount calculated according to the table in Rule 2 above.

4. If any owner claims that during the period 1st November, 1919, to 31st October, 1920, his output was less than his normal output owing to:—

(a) Lack of labor;
(b) Abnormal ill-health of his labor forces;
(c) Disease of his trees from which they have since recovered;
(d) Resting of the trees; or
(e) Any other reasonable cause;

such addition shall be made to his actual output from 1st November, 1919, to 31st October, 1920, for purposes of certification as would, in the opinion of the committee, equal the loss of output sustained thereby, but in no such case shall the total output for the holding exceed the quantity to which he would have been entitled if he had applied under Rule 2 hereof.

5. If any owner can prove to the satisfaction of the committee that prior to the commencement of the enactment he has entered into bona-fide forward contracts for the sale and delivery of a quantity of rubber in excess of the amount of his normal "standard production" as arrived at under these rules, diminished by the percentage of restriction for the time being in force, and that either:—

(a) Such contract specifies that the rubber to be delivered under the contract is rubber from his holding only; or

(b) He is unable to contract on the market to buy in the excess contracted for over the quantity he would be allowed to produce at a price not greater than the price at which he has sold, the committee may allow him as standard production such quantity as when diminished by the percentage of restriction for the time being in force would allow him to produce a sufficient quantity to cover his contracts, provided that certificates issued under this rule may be revised by the committee at any time when such contracts expire or the percentage of restriction for the time being in force is altered.

6. Certificates of "standard production" when issued may not be varied within 12 months of the date of such issue, but on the expiration of such period of 12 months or any subsequent period of 12 months any owner may apply for revision of the quantity for which his holding has been assessed on the grounds that further areas have since the issue of the certificate attained the age of five years and are in a condition to tap. In such case the committee shall increase the quantity assessed in accordance with the rules laid down herein.

7. If any owner states on his application form that he desires to be assessed at any quantity other than his actual output from the period of 1st November, 1919, to 31st October, 1920, and gives his reasons for this request, the committee shall, before issuing any certificate, notify such owner of the quantity at which the committee propose to assess him, and inform him that in the event of his objecting to such assessment he must state his case personally or by his representative or by letter at a specified time and place.

Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, OCTOBER 18, 1922—The market for industrial chemicals during the last period has shown a much firmer tone, with many advances in prices and a noticeably greater increase in inquiries which would indicate a definite change for the better. Since the passage of the tariff bill a more confident feeling prevails among producers and dealers. The important effect of the new tariff law will be the help to business by making for a more staple and steady market. It is the general belief that the market will be an active one during the fall and winter seasons.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .90 @	.95
Aniline oil, bulk basis,	lb.	.16 @	.17
Excellerex,	lb.	.35 @	.40
Formaldehyde-Aniline	lb.	.45 @	.50
Hexamethylene-tetramine	lb.	.72½ @	.75
Paraphenylenediamine	lb.	1.55 @	1.57
Thiocarbanilide, kegs	lb.	.35 @	.40
Vulcocene	lb.	.35 @	—

Inorganic

Lead, dry red bbls.	lb.	.09 @	.09¼
Lead, white, basic carbonate	lb.	.07¼ @	.08
Litharge, domestic	lb.	.09½ @	—
imported	lb.	.17 @	—
Lime, Superfine	lb.	.02 @	.02½
Magnesia, calcined, light,	lb.	.23 @	.24
extra light	lb.	.45 @	—
heavy	lb.	.05 @	.05½
Orange Mineral	lb.	.12½ @	.14

COLORS

Blacks

Carbon Black	lb.	.16 @	.20
Micronex	lb.	.17 @	24
Lamp Black	lb.	.12 @	.40
Bone "	lb.	.05½ @	.07½
Drop "	lb.	.07½ @	.16
Ivory "	lb.	.15 @	.45

Blues

Prussian	lb.	.55 @	.60
Ultramarine	lb.	.10 @	.35
Cobalt	lb.	.21 @	.26

Browns

Iron oxide	lb.	.05 @	.06
Sienna, Italian,	lb.	.06 @	.14½
Umber Turkey,	lb.	.04 @	—
Vandyke, domestic		.03½ @	.04½

Greens

Chrome, light, c. p.	lb.	.30 @	.32
medium	lb.	.35 @	.36
dark	lb.	.36 @	.45
commercial	lb.	.12 @	—

Reds

Antimony, crimson	lb.	.34 @	.40
golden	lb.	.17 @	.21
red sulphuret	lb.	.20 @	.22
Indian, English, pure lb.		.12 @	.15
Para toner	cwt.	1.10 @	1.20
Toluidine toner	lb.	2.10 @	—
Tuscan red	lb.	.17½ @	.35
Venetian red	lb.	.03½ @	.06
Vermillion, quicksilver, English	lb.	1.25 @	1.45
domestic	lb.	.25 @	.30

Whites

Albalith	lb.	.06 @	.06½
Aluminum bronze	lb.	.55 @	.60
Azolith	lb.	.06 @	.06½
Lithopone, domestic (factory)	lb.	.06¼ @	—
Zinc oxide, American Horse Head Special	lb.	.07¼ @	.08
XX red	lb.	.07 @	.07½
American Azo: ZZZ (lead free)	lb.	.07 @	.07½
ZZ (under 5 per cent leaded)	lb.	.06¼ @	.06¾
Z (8-10 per cent leaded)		.06 @	.06¼
Zinc oxide, French process, White seal	lb.	.11 @	.11¼
Green seal	lb.	.09¾ @	.10¼
Red seal	lb.	.08¾ @	.09¼

Yellows

Chrome, light, c. p.	lb.	.17 @	—
dark	lb.	.17 @	—
medium	lb.	.17 @	—
Ocher, French	lb.	.02¾ @	.03½
domestic	lb.	.02½ @	.03

COMPOUNDING INGREDIENTS

Aluminum flake	ton	25.00 @	30.00
hydrate	lb.	.17 @	.18
Ammonia carbonate,	lb.	.09½ @	.10¼
Barium carbonate	ton	65.00 @	70.00
Barium Dust	lb.	.04½ @	—
Barytes, southern off-color,	ton	.15 @	.17
Western, prime white,	ton	23.00 @	—
Basofor	lb.	.04¾ @	—
Blanc fixe, dry, f.o.b. works	lb.	.04¼ @	.04½
Carrara filler	lb.	.01½ @	—
Chalk, precipitated, extra light	lb.	.03½ @	.04¼
heavy	lb.	.02½ @	.03¼
Clay, China, domestic,	ton	15.00 @	16.50
imported	ton	16.25 @	23.25
Dixie	ton	22.00 @	32.00
Blue Ridge	ton	22.00 @	32.00
Fossil flour	ton	60.00 @	—
Glues, extra white	lb.	.30 @	.40
medium white	lb.	.20 @	.26
cabinet	lb.	.18 @	.30
cabinet low grade	lb.	.15 @	.18
common bone	lb.	.08½ @	.14
Graphite flake, bbls.	lb.	.06½ @	.08
amorphous	lb.	.04 @	.10
Infusorial earth, powdered	ton	60.00 @	—
bolted	ton	65.00 @	—
Mica, powdered	lb.	.15 @	—
Rotton Stone (powdered)	lb.	.02½ @	.04½
Silica (gold bond)	ton	35.00 @	—
Soapstone, powdered	ton	15.00 @	20.00
Starch, powdered corn	cwt.	2.85 @	2.95
Talc, domestic	ton	15.00 @	18.00
French	ton	25.00 @	32.50
French, high grade	ton	43.00 @	48.00
Italian	ton	47.00 @	58.00
Terra Alba	ton	20.00 @	25.00
Tripoli, white	ton	25.00 @	28.00
Whiting, commercial	cwt.	1.00 @	1.10
Quaker	ton	13.00 @	15.00
English cliffstone	cwt.	1.70 @	1.90
gilder's bolted	cwt.	1.15 @	1.25
Paris white American	cwt.	1.35 @	1.45
Wood pulp XXX	ton	30.00 @	—
" " X	ton	25.00 @	—
Zinc Oxide— 5 per cent leaded		.06¼ @	.06¾
10 per cent lead sulphate	lb.	.06 @	.06½
20 per cent lead sulphate	lb.	.06 @	.06½
35 per cent lead sulphate	lb.	.06 @	.06½

(Also see whites)

MINERAL RUBBER

Gilsonite	ton	65.00 @	—
Genasco (factory)	ton	60.00 @	—
Hard hydrocarbon	ton	32.00 @	42.00
Soft hydrocarbon	ton	30.00 @	35.00
Pioneer M.R.	ton	42.00 @	44.00
320 M. P. hydrocarbon (c. l. factory)	ton	45.00 @	50.00
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @	43.00
Synpro, granulated, M. R. (factory)	ton	55.00 @	65.00

SOFTENERS

Acids

Acetic, 28 per cent	cwt.	2.80 @	3.05
Phenol	lb.	.18 @	.21
Cresylic, 97 p. c.	lb.	.60 @	.62
95 p. c.	lb.	.55 @	.57
Muriatic, 20 degrees	cwt.	1.10 @	1.25
Nitric, 36 degrees	cwt.	4.75 @	5.25
Sulphuric, 66 degrees	ton	15.00 @	16.00
60 degrees	ton	10.00 @	12.00
Tartaric, crystals	lb.	.32 @	—

Alkalies

Caustic soda, 76 p.c.	cwt.	3.45 @	3.75
Soda ash, 58 p.c.	cwt.	1.95 @	2.30

Oils

Castor, No. 3, bbls.	lb.	.12½ @	—
Corn, crude, bbls.	lb.	.08¾ @	—
refined	lb.	.10½ @	—
Chinawood, bbls.	lb.	.12¾ @	.13
Cottonseed,	lb.	.10 @	—
Glycerine, drums	lb.	.17 @	.17½
Linseed, domestic	gal.	.83 @	.83½
imported	gal.	.84 @	.85
Palm, Niger		.05 @	.06
Lagos	lb.	.06¾ @	.07
Peanut, domestic, crude	lb.	.11 @	.12
Petrolatum, amber	lb.	.04½ @	.04¼
dark amber	lb.	.03⅝ @	.03⅞
Pine, steam distilled	gal.	.80 @	.85
Rapeseed, refined	gal.	.78 @	.81
blown	gal.	.90 @	.95
Rosin, first rectified	gal.	.41 @	—
second rectified	gal.	.43 @	—
Tar, commercial	gal.	.31½ @	—
Soya Bean		.11½ @	—
Petrolatum, standard	lb.	.05 @	.08

Resins and Pitches

Cumar resin, hard	lb.	.09 @	.14¾
soft	lb.	.09 @	.14¾
Tar Retort	bbl.	11.00 @	—
kiln burned	bbl.	12.50 @	—
Pitch, Burgundy	lb.	.04½ @	.06
coal tar	ton	.01½ @	—
pine tar		.03 @	—
Rosin, grade K	bbl.	6.70 @	—
Strained	bbl.	6.70 @	—
Shellac, fine orange	lb.	.62 @	.63

Solvents

Acetone, drums	lb.	.17½ @	—
Alcohol, denatured, No. 1 bbls.	gal.	.34 @	.38
Benzol, 90 per cent	gal.	.27 @	.32
pure	gal.	.30 @	.35
Carbon bisulphide,	lb.	.06 @	.07
tetrachloride	lb.	.09½ @	.10½
Dimethylaniline	lb.	.35 @	—
Motor gasoline, steel bbls.	gal.	.25 @	—
Naptha, V. M. & P.	gal.	.24 @	—
Toluol, pure	gal.	.30 @	.35
Turpentine, spirits	gal.	1.45 @	—
wood	gal.	1.35 @	—

Waxes

Beeswax	lb.	.36 @	.40
Carnauba, No. 1	lb.	.20 @	—
Ceresin, white	lb.	.09 @	.10
Bayberry	lb.	.20 @	.24
Montan, crude	lb.	.03½ @	.04
Ozokerite, black	lb.	.20 @	.21
green	lb.	.25 @	.26
Paraffine	lb.	.02¾ @	.03
Sweet wax	lb.	.12 @	—

SUBSTITUTES

Black	lb.	.08 @	.14
White	lb.	.09 @	.16
Brown	lb.	.10 @	.15
Brown factice	lb.	.07 @	.15
White factice	lb.	.07½ @	.15

VULCANIZING INGREDIENTS

Lead, black hyposulphite (black hypo)	lb.	.25 @	.30
Sulphur chloride (jugs)	lb.	.13½ @	—
Sulphur flour	cwt.	1.35 @	1.70
Bergenport, pure (bbls.)	cwt.	2.55 @	2.90
superfine, (bags)	cwt.	2.00 @	2.40

Spot Rubber Reaches 23 Cents

Following Approval of the Stevenson Export Duty Plan by the British Colonial Office, First Latex and Ribbed Smoked Sheet Rise to 12 Pence in London and 23 Cents in New York -- May Go to 30 Cents or Higher Before Much Reaction Sets In

NEW YORK, Oct. 18, 1922

THIS is the first real market we have had in a year" was the way one prominent crude rubber broker expressed his opinion of the rapid rise in the crude rubber market immediately following receipt of cable news from London that the British Colonial Office had given its official sanction to what is known as "The Stevenson Plan" of restricting production on the plantations of Ceylon, the Malay States, and the Straits Settlements. The report of the committee was published on Oct. 12 and the London market responded at once to the favorable news by offering as much as 11½ d. for plantation standard crepe and ribbed smoked sheets, closing for the day at 10 d.

The 12th was Columbus Day, a holiday in New York, but the next day spot rubber sold here up to 19½ cents. The rise continued practically without a break until it touched 23 cents on Oct. 18, and at this price several crude rubber buyers representing large rubber manufacturers in Akron and elsewhere placed orders amounting to hundreds of tons, and future orders in considerable volume were placed at much higher figures.

30-Cent Rubber in Sight

One of the leading importers and dealers in raw rubber said that 30-cent rubber was in sight; in fact, it was the expressed determination of the British committee which adopted the Stevenson export duty scheme to bring the spot market price up to that figure to permit plantation and transportation costs and the export duty to be covered and leave a fair profit for the producer. It is not the intention of the committee or the colonial legislatures, which must formally pass upon the details of the plan and provide machinery for its operation, to permit any profiteering or any manipulation which would create an unhealthy speculative condition in the market abroad or at home. This dealer stated that all those who had looked into the plan carefully, including the largest users of crude rubber, the manufacturers, were agreed upon the fairness and wisdom of the proposals and that they would work out to the best interests of every member of the rubber industry.

The British Colonial Office plan for the curtailment of production, which at the same time will provide considerable much-needed revenues for the governments of Ceylon, the Federated Malay States, and the Straits Settlements, will go into effect on Nov. 1. It is confidently expected that by or before that date the various colonial legislatures will have definitely given their approval to the plan. An outline of this plan is given below.

Consumption Exceeds Production

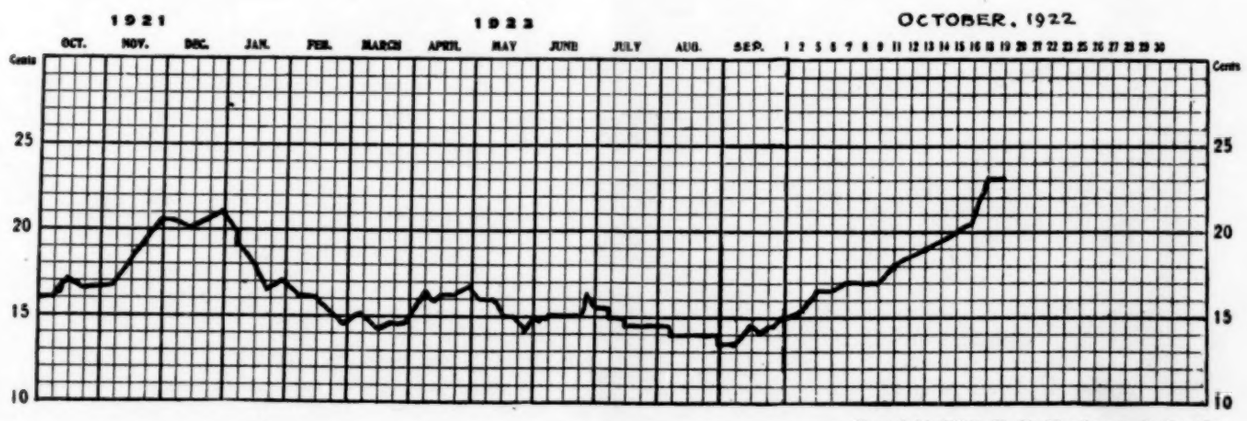
A curious feature of the present market situation is that the consumption of crude rubber at the present time is running ahead of current production on the plantations and is beginning to cut into the stocks of rubber held in Singapore, Colombo, London, and New York. It is conservatively estimated that the consumption of crude rubber in the United States for 1922 will reach the unprecedented total of 270,000 tons of which eighty per cent will go into the manufacture of tires and tubes. The consumption by manufacturers for 1923 promises to exceed this figure by many thousands of tons, due to the increasing number of automobiles, which again is due to several favorable factors such as the lower prices of cars and the improved condition of the highways.

As one rubber man pointed out, the working of the natural law of supply and demand would within a year or two have eliminated all but a normal surplus of rubber stocks without the necessity of government intervention with curtailment of production through taxation. But the restriction plan will have the effect of accelerating the operation of this natural law and expediting the improvement of price and production conditions, so that the planter will have a reasonable profit and the plantation workers will be assured of steady work at fair wages. Research work also can continue unimpaired, and additions to present plantations and new plantations can come into being gradually as they are needed.

So far as the Dutch, Chinese, and **Japanese planters are** concerned, the British estate owners, who it is understood constitute about seventy-five to eighty per cent of the rubber growers in the Far East, feel that the Dutch Colonial Office will in all probability follow the lead of the British colonial governments when it is seen that the export duty plan is working out successfully; and the Chinese and Japanese rubber exports can be controlled by local legal machinery to a large extent. Whatever excess shipments manage to filter through will not affect the market to any degree.

Export Duty Plan as Approved

At a meeting of the Council of the Rubber Growers' Association held on



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COURSE OF MARKET PRICES OF RIBBED SMOKED SHEET AT NEW YORK FROM OCT. 1, 1921, TO OCT. 19, 1922

September 4, it was decided to convene a special meeting of the Council, to be held on Monday, September 11, at noon, for the purpose of adopting the following resolution:—

"That this Council is of the opinion that the Colonial Office Committee should proceed to the introduction of a scheme as set out in the report of the Stevenson Committee, with the voluntary assistance of the British and other interests operating in the Netherlands Indies."

The Stevenson scheme referred to adopts as the standard production the actual output of each producer during the twelve months November, 1919, to October 1920, estimated to aggregate 330,000 tons of plantation rubber from all producing countries, and restricts to a percentage of the standard production, leaving a margin of production available to meet forward contracts or cases of special hardship, such percentage being fixed from time to time by notification in the "Government Gazette."

Scale of Duties

The following is the scale of duties proposed:

Percentage of standard production exported. per cent.	Subject to duty per lb. s. d.
Over 100	1 2
91 to 100	1 0
81 to 90	0 10
76 to 80	0 8
71 to 75	0 6
66 to 70	0 4
61 to 65	0 2
60 and under	0 1

Of these rates of duty, 1d. per pound, irrespective of the price of rubber or quantity exported, would be imposed permanently in lieu of the existing ad valorem duty, but rates in excess of 1d. would be temporarily imposed, say for three years. When the rubber situation improved so as to justify an increased percentage of standard production being exported, the necessary elasticity would be secured by fixing the minimum rate of 1d. just below the increased percentage required; thus, if export of 70 per cent, instead of 60 per cent could be absorbed the duty on export of 70 per cent and under would be fixed at 1d., duty on 71 per cent and over remaining as in the scale.

Quotations as of Oct. 18 are practically as follows:

	Buyers' Offers
Plantations	
Ribbed Smoked Sheets	.23
First Latex, spot	.23
November/December	.23½
January/March	.24
April, May, June	.24¾
Amber Crepe No. 2 spot	.22
Amber Crepe No. 3 spot	.21½
Light Clean Thin Brown Crepe	.22
Commercially Clean Thin Brown Crepe	.21¾
Specky Brown Crepe	.21½
Roll Brown Crepe, spot	.20½
Paras	
Madeira Fine	.27
Acre Fine	.24
Up-river Fine	.24
Up-river Medium	.21½
Up-river Caucho Ball (shipment)	.17
Up-river Coarse	.20
Islands Fine	.21½
Islands Medium	.21
Islands Coarse	.12
Cameta	.12
Xingu Ball	.14½
Tapajos Fine	.21⅛
Pontianac	
Prime Pressed	.12½
Plantation	.06¾
Bangermassin-Palembang	.07½
Siak Gutta Percha	.15⅝
Prime Macassar	2.85
Balata	
Panama Block	.40
Surinam Sheets	.68½
Columbia Block	.47
Venezuela Block	.60

Scrap Rubber

New York, Oct. 18, 1922

There has been some advance in the price of standard scrap in sympathy with the rapid rise of crude rubber prices, but the activity in this market is due largely to dealers covering their short commitments rather than an actual demand from buyers. Some scrap rubber dealers sold short at lower prices and now they must take their losses at the higher level. One of the shrewdest brokers in this line said today that if crude rubber goes to 30 cents there will develop a real demand from the reclaimed rubber plants for scrap of all grades, because then it would be cheaper to work over the scrap than to use new raw rubber.

Quotations of this date (per pound in carload lots delivered, except Mixed and Standard White Auto which are quoted per ton) are as follows:

Auto tire peelings	.00½	@	.00⅝
Standard White auto ....ton	12.00	@	14.00
Mixed auto .....ton	10.00	@	12.00
Bicycle tires	.00⅜	@	.00½
Clean solid truck tires	.00¾	@	.01
Boots and shoes	.02⅝	@	.02¾
Arctics, trimmed	.01¾	@	.02
Arctics, untrimmed	.01¼	@	.01⅜
Inner tubes, No. 1	.03	@	.03¼
Inner tubes, compounded	.02	@	.02¼
Inner tubes, red	.02½	@	.02¾
Battery jars, clean hard rubber	.01¼	@	.01½
Heels and pads	Nominal		
Black mixed	Nominal		
Garden Hose	.00¼	@	.00⅜
Air brake hose	.00⅜	@	.00½
Red packing	.00½	@	.00⅝
White mixed rubber	.00¼	@	.00⅜
White druggist sundries	.01	@	.01¼

American Rubber Patents

1,428,040 George D. Kratz, Akron, Ohio, assignor to The Falls Rubber Company, Cuyahoga Falls, Ohio. Tire and Method of making same.

1,428,027 Walter R. Green, Chicago, Ill. Attachment for Tire Carrier.

1,427,897 Nelson W. Finch, Chicago, Ill. Combined Cushion and Pneumatic Tire.

1,428,452 Philip N. Schore, Lancaster, Ohio. Emergency Tire.

1,428,420 Barthold de Mattia, Clifton, N. J. Machine for Cutting and Feeding Tire-Making Fabric.

1,428,428 Oscar M. Fredd, Hancock, Mich. Method and Tire Vulcanizing Apparatus.

1,428,467 Stephen Andrews, New York, N. Y. Armor for Tires.

1,428,440 Carl Kerschbaum, Hinwil, Switzerland, assignor to the Firm Stossel & Cie., Wadensweil, Switzerland. Device for Mounting and Removing Tire.

1,428,508 Reginald H. Waters, Cumberland, Md., assignor to Kelly-Springfield Tire Cimpany, New York, N. Y., a corporation of New Jersey. Method of making semisolid Tires.

1,428,419 Barthold DeMattia, Clifton, N. J. Method of making Shoes or Casings for Pneumatic Tires.

1,428,382 Melvon A. Marquette, Chicopee Falls, Mass., assignor to the Fisk Rubber Co., Chicopee Falls, Mass. Inner Tube and Method of Making the Same.

1,428,381 Melvin S. Lower, Ashland, Ohio, assignor to the Faultless Rubber Co., Ashland, Ohio. Tubing Machine.

1,427,109 Mahlon O. Kasson, Chicago, Ill. Apparatus for Vulcanizing Rubber articles.

New Incorporations

DELAWARE

Vasta Tire Co., to deal in tires, tubes, etc. $500,000. Principal office, Dover, Delaware. Jennings Corporation, to deal in tires and tubes. $5,000,000. Agent, Corporation Trust Co. of America.

The Underwood-Kerr Rubber Co., to borrow money and to make and issue notes. $300,000. Principal office, Dover, Delaware.

Oklahoma Fabric & Rubber Co., $2,500,000. Agent, Corporation Service Co., Wilmington, Del. Principal office, Wilmington, Del.

H. H. Allyn Rubber Corp., to manufacture automobile tires, $100,000. Agent, Corporation Guarantee & Trust Co. Principal office, Philadelphia, Pa.

ILLINOIS

The Witwer Battery Co., to manufacture and sell automobile batteries. $500,000. H. T. Witwer, president; G. H. Keeley, vice president and treasurer; F. M. Witwer, secretary. Principal office, 630 St. Louis street, Danville, Illinois.

MASSACHUSETTS

Peavey Rubber Co. of New England, to manufacture rubber goods. $40,000. Incorporators: Ralph A. Peavey, Newton, Massachusetts; Harry W. Conant, Somerville, New Jersey and Albert T. Daniel, Cambridge, Massachusetts.

C. A. Goodnow Shoe Co., to deal in boots, shoes, rubbers etc. $150,000. Incorporators: C. A. Goodnow, 424 North Main street, Natick, Massachusetts; W. F. Garcelon, 608 Sears Building, Boston, Massachusetts; E. F. Abbott, Auburn, Maine; J. T. Hollis, Hingham, Massachusetts. Priscipal office, Boston, Massachusetts.

The Plymouth County Shoe Co., to manufacture boots, shoes, rubbers, etc. $95,000. T. L. Smith and I. Smith, Brockton, Massachusetts; H. J. Ferngold, Dorchester, Massachusetts. Principal office, Brockton, Massachusetts.

MISSOURI

Easton Avenue Tire Works, to deal in tires and tubes. $10,000. E. Hilty, president; I. H. Tice, vice president and O. S. Norton, secretary. Principal office, 5839 Easton Ave., St. Louis, Missouri.

NEW JERSEY

Ackerman Rubber Co., to manufacture rubber products. $250,000. Principal office, 39 Paterson street, Paterson, New Jersey.

Century-Plainfield Rubber Co., to manufacture and sell tires, tubes and all rubber products. $2,000. N. Saks, president; H. C. Schleicher, treasurer; J. M. Saunders, secretary. Principal office, Plainfield, New Jersey (Formerly Century-Plainfield Tire Co.)

The Murray Rubber Co., to manufacture rubber goods. $2,000,000. Principal office, North Clinton avenue and Mulberry street, Trenton, New Jersey.

NEW YORK

Dragon Tire & Rubber Corp., to deal in tires and tubes. $25,000. Incorporators: A. Steiner, M. Myers and I. Bregoff. Attorney, H. London, 302 Broadway, New York.

Albion Mechanical Rubber Mfg. Co., to manufacture rubber goods. $5,000. Incorporators: I. E. Dubois, E. M. Dubois and K. V. Dubois. Attorney, B. C. Eadie, St. George, Staten Island, New York.

OHIO

The Celina Co., to manufacture rubber goods. $25,000 Incorporators: R. W. Oliver, C. W. Oliver, E. W. Bassett, J. B. Bassett and J. C. Cochrane. Principal office, Toledo, Ohio

The Monarch Belting Co., to manufacture leather and rubber products. $25,000. Incorporators: G. D. Frieze, H. J. Kimpel, R. Kimpel and M. Miller. Principal office, 1270 Ontario street, Cleveland, Ohio.

RHODE ISLAND

Davis-Jones Insulated Wire Co., to manufacture and deal in insulated wire. $80,000. D. S. Davis, president and treasurer; J. F. Murphy, secretary. Principal office, Pawtucket, Rhode Island.

WASHINGTON

The Sunset Rubber Co., to manufacture, buy and sell rubber products. $150,000. Incorporators: C. E. Powley, S. A. Powley and W. A. Cloud. Principal office, Everett, Washington.